

Define Yourself!

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2001 PC Forum (n.) —

BY ESTHER DYSON AND KEVIN WERBACH

Some months ago, casting around for a theme for this year's PC Forum, we came up with "Define yourself!" After last year's hype and fuzzy thinking, we believe, now is the time to think clearly, define what you are and are not. Companies need to know who their customers are. Customers want to know what they are paying for and under what rules. Investors want clear plans and visible sources of revenues.

Now, as we assemble the Forum documentation, we're delighted at how the concept runs through all our discussions with our speakers. From high-tech infrastructure to airline rules, from content plays to distributed computing services, people and businesses are demanding clarity and focus, far more than "vision." What do you offer now, not your vision of what you might offer? What are the rules, not the chances, for getting an upgrade? How can you guarantee profitability?

As everything scales up and most entities on the Net are strangers to one another, people want clarity in their dealings online. They want to know whom they are working with and to whom they are paying their money and giving their data; they want to know the rules underneath the code. As the old intermediaries give way to new ones, their partners want to understand them and their models.

It's well-known by now that customers are getting the upper hand on the Net because they can easily compare prices; they can easily move from site to site. But there's more to it than that. Companies who think all they have to do to win is lower their prices (and costs!) are missing the point. They need to have a tangible presence, a brand that defines something in particular.

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From businesses to governments to people posting praise or problems on the Net, everyone is being asked to define who they are and on what terms they speak. The vagueness and blind enthusiasm are gone; many are still willing to believe, but they want evidence.

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Bring back friction!

As the Internet scales up and it becomes more “real” to more people, it is becoming not a global village but rather a global city of awesome proportions. Rules and tools for clarity are an attempt to put a little friction back into the slippery world of the Net, to turn it into a collection of the global villages someone promised us long ago.

We have organized the Forum into a series of panels, presentations, conversations and demonstrations over three days. Where relevant, the writer and moderator of the session (Esther Dyson or Kevin Werbach) is identified by initials following the title.

MONDAY, MARCH 26

COUNTERPOINT: Defining Ourselves - Identity and Security (ED)

Does knowing who someone is make you safe? Not necessarily: Most child molesters attack relatives; many corporate security breaches are inside jobs.

Yet the world seems to work better when people know one another's identities: Not only can you track someone down; you can offer them better service – everything from special deals to frequent-buyer discounts, follow-up maintenance services, alerts for delayed airline flights. Meanwhile, people make judgments based on other people's reputations, and behave better out of concern for their own. With clear identities, you can implement policies in code and execute them impartially and consistently – assuming the policies are fair and transparent in the first place.

Holding both promise and peril, security and identity are facets of almost every big issue in the digital world. They touch it all: privacy, anonymity, integrity of data and safety of assets, freedom of speech, legitimacy, trust and trustworthiness, branding, visibility of marketers and visibility to marketers.

As people move onto the Web, they expect the same security and for-granted that they had in the real world. Yet because it is a new world and a supposedly clean, well-lighted digital place, with everything in order and easily searchable, they don't expect cockroaches, dust, germs.... They want sleaze and lies clearly labeled; they want gated neighborhoods. Yet they are lost, lacking the familiar social cues they can read so well offline.

So whom can they trust? If you create one central locus of trust, you also create a central locus of power.

Stratton Sclavos, VeriSign - May I see your cert?

Stratton Sclavos has dramatically changed VeriSign's identity since he joined the four-person company in 1995, when it was focused solely on digital certificates and digital signatures. The company was spun out from RSA Data Security: The initial idea was to build a service bureau to provide digital certificate services for Website operators to establish secure sessions with customers using SSL (the secure sockets layer protocol). From that beginning the company has extended into many more

types of applications and platforms: secure email, extranets, VPNs, cable modems, and payment gateway services. The company's stated mission is to enable everyone, everywhere to use the Internet with confidence.

Despite the popular notion that the Net's lack of barriers and anonymity makes it friction-free, Sclavos points out, "The reality is that the better we know someone or some business, the less friction there is in consummating a transaction (personal or commerce). And the more times we interact with a given party with nothing going wrong, the more we trust each other to expand the relationship."

The company's most recent transformation came with its acquisition of Network Solutions (NSI) last year; NSI maintains the registry of domain names ending in .com, .net and .org.¹ Previously VeriSign gave identity to individuals and corporations; now it gives identity to Net real estate (and to its owners).

Rather than a government's instinct to keep order, however, VeriSign has a drive to make money, with a small fee (tax?) for identity. If in fact an ID becomes necessary for almost any activity in cyberspace, is not the cost of a certificate (or domain name) then a tax? No, so long as there is free competition – both for the service and for the designation of trustworthiness behind it.

And if governments require it? Many people assume that certification of identity is a job, even a duty, for governments. That's certainly the case in many countries, especially among government officials. Sclavos's goal is for the *participants* to ask for them. "It's an interesting question," says Sclavos. "Within Asia, and to a lesser degree in Europe, governments certainly believe identity-based certificates are something they will issue." Indeed, he says, "We don't issue that many certificates directly to the end-user. Banks make up approximately 20 percent of the [certificate] business and government-related services about 10 percent. The rest comes from a variety of private-sector players – manufacturers, consultants and the like – who issue them to employees and partners."

"We haven't been asked to work with a government where their intent was to limit privacy or impose surveillance. We would view ourselves as a high-integrity company," says Sclavos. But there are "challenges," he acknowledges: "We've had at least six different people from the Chinese Ministry of Information Industry tell us they are the only legitimate DNS manager for China."

¹ NSI's contract with the Internet Corporation for Assigned Names and Numbers (ICANN), the DNS policy body, is now being revised. Disclosure: Until November I was the chairman of ICANN, I am still involved as a member of the At-Large Study Committee, which is evaluating ICANN's membership approach. – ED

However, as a commercial guy, Sclavos views the world differently: In commerce, competing parties *can* be legitimate. “What makes the technology behind our certificates and tools so special? Nothing. They’ll have to fit within a network of tools for security, identity, anonymity. The technology is ubiquitous, but we use it based on context. If you open up your wallet, you find a variety of certificates: A driver’s license, a library card, an airline club card, a credit card. Any ID is a way of gaining access to a community. It’s not one-size-fits-all. Your badge doesn’t charge goods. Your credit card won’t let you in the door here [at VeriSign]. American’s Admirals Club Card doesn’t carry any weight at Delta’s Crown Room.”

“You can get yourself wrapped around the axle in this debate [about security and anonymity]. Because of course the value of the Net is that you don’t have to identify yourself, and it can be such a valuable platform for open communication. On the other hand, on the Yahoo! chat boards some people are intentionally fraudulent.”

But won’t people just learn for themselves how much credence they want to give to others, depending on where they are and how tight the controls are? Won’t they figure out for themselves how much to trust someone without a clear, vetted identity? That leads to the overall concept of trust – a hot issue especially last month, when Lauren Weinstein’s *Privacy Digest* surfaced Network Solutions’ habit of selling data from its domain-name registration database to marketers.

“This is not something we really want to promote, even though our contract with ICANN requires us to make the data publicly available,” says Sclavos. Although obviously he was pushing NSI for results, he says, he missed some details on how they were achieved.... “The \$5 or \$10 million extra that this will generate will be dwarfed by the bad publicity. I told them, ‘You guys should immediately say we were wrong; we should not do this.’” Of course, other people are doing it, but that’s not the point. VeriSign wants to be the Internet’s most trusted utility, its Website proclaims. The challenge is that this requires more than technology... as we’ll discuss on the panel!

Fran Rooney, Baltimore Technologies – Security, straight up

Fran Rooney has been starting and selling companies since the early 90s, but Baltimore looks like a keeper. He had long been knocking about the world of software, finance, payment systems, data... and in 1996 he decided that the Internet was an exciting medium – but only if someone could resolve the security problems. He resolved to be that someone, and in September 1996 he started Baltimore with six partners, mostly drawn from the people he had worked with over the years in

finance and software. The idea was to develop encryption tools and products. Whether lucky or purposeful, the company benefited from the Irish government's enlightened attitudes to encryption and e-commerce. (US vendors were prohibited from exporting strong encryption, which made the market less interesting for them, whereas Baltimore could export both to the US and to most other countries.)

The company's first product was UniCERT, an authentication certificate. And one of its own first "certificates" of success was a deal with the European Commission to develop Eurotrust, a proof-of-concept to show how European companies could join the online world with security intact. But despite the official approval, e-commerce was growing rather slowly in Europe compared with the US, and Rooney decided he needed more heft – and cash – quickly.

In 1999, he merged Baltimore, then with about 400 employees, \$30 million in revenues and substantial losses, into Zergo, a publicly traded UK company. A NASDAQ listing and a secondary offering followed, raising \$170 million.

Since then, the company has grown to 1200 employees, with revenues more than doubling. Its overall strategy is more focused on the underlying technology than VeriSign, which is going after a more retail market. Baltimore manages the infrastructure: everything from certificates to specific access control, authorization, transaction-based protections. Says Rooney: "We want to protect electronic resources, from data files to applications and content, and also printers, servers, remote access." The company also works on internal security for its clients, not simply verifying identity but controlling access to resources inside according to a particular user's role and access privileges.

"We're also very interested in digital rights management," says Rooney. "The question is the business model. The industries that need it most haven't indicated they're willing to pay for it. The music and video-on-demand people have made a lot of noise, but they haven't shown how they want to charge once they've figured out how to protect it. There's a number of areas within digital rights that we're exploring."

It's hard to be in the security business without being sensitive to the social/political issues swirling around. Rooney's viewpoint, which he attributes to the Australians, is that more systems mean greater security and privacy. "We're working with the Australian and Irish governments on how to do tax returns... which means solving issues around privacy and messaging. We need infrastructure that protects privacy."

“Electronic identities are the best way to foster privacy. The data can be managed by machines rather than individuals. Machines don’t get curious. They can be audited and electronically controlled. A machine isn’t going to go off and change its mind, so it’s key to build a system that avoids human intervention. I think that idea has legs. You need properly controlled machines, of course, and there’s a lot of work to be done.” You can audit the machines, of course, but who does the audit?

Overall, Baltimore is expanding not just geographically, but also functionally, into devices such as wireless phones or secure television sets (or boxes) that can support secure e-commerce. “A lot has to happen to have IDs in place everywhere we will need them, but we will have them,” Rooney says confidently. “Organizations will drive that, will insist that people be properly identified. You’ll need an ID to do business; you’ll need an ID to get someone to read your email.”

“Look at how our view of email has changed. A few years ago we were all very diligent in answering our email, but now it has become a pain. It used to be special: You could reach anyone. But now everyone can reach *you*! Organizations will start to treat their email servers as assets, not as a public service. They’ll start to count the costs of maintaining them... and they’ll want to control access.” And at that point Hotmail and the like may start selling their customers certificates – not so much to manage their identities, as to be able to get them to pay their costs. No one will want to advertise to uncertified audiences anymore....

“Anonymity is going to be difficult to maintain,” continues Rooney. “Most Websites will ultimately want to know who’s on their site. I’d be a great supporter of freedom, but I expect that ultimately everyone will want to know who you are. You must authenticate yourself as being certified, but then you could get anonymity or a guarantee of how information about you will be used.”

“One driver of our business is how the Web is moving to a service-based culture. All the latest and greatest technologies are made available as services. More and more we want to use devices that are constrained – by size or power or distance – but we want access to a lots of stuff. That raises security issues, obviously. We have put hooks for a certificate into the Palm OS, and we’re working with Motorola, Ericsson, DoCoMo. We sell the certificates, and we also provide the infrastructure to manage them.”

He continues: “Overall, the risks are increasing as companies do more and more online. First, the risks are just internal, but then you need to allow selective access to your partners, to remote employees and eventually, in a limited way, to customers.”

PANEL: Defining the New Media (KW)

Content is king...content is dead...content is king again. REPEAT. It's a familiar refrain in the interactive media world. With the shriveling of the online advertising market and the failure of such high-profile Web content sites as Pop.com, Entertaimdom, Pathfinder, Digital Entertainment Network, APB News and Pseudo, the pendulum has swung toward the nay-sayers. Was the dream of a new media nothing more than a fantasy?

The trouble is that we can't simply go back to the good old days of three broadcast networks and thriving, well-read local newspapers. The very concept of mass media is under attack. The interesting questions are not whether CPM rates for banner ads will go back up or whether The Wall Street Journal's paid online subscriptions or The New York Times' free advertiser-supported site is the better model. Those are surface manifestations of bigger issues. The long-standing social contract between content providers and audiences – either pay for access or let yourself be marketed to... but whatever you do, be passive – falls apart when users have a plethora of choices and tools such as Napster that circumvent carefully constructed business models.

In this new environment, how does one define a media company? Does a community-oriented venture such as PlanetOut or a vertically focused content provider such as Inside stand a better chance than an all-encompassing institution such as The New York Times? As interactive media becomes richer with greater use of streaming audio and video, will content providers get richer as well? Defining new media means developing new value chains that bind users, content creators, marketers and intermediaries together, while casting off the shackles of restricted choice, incompatible platforms and limited interactivity. A tall order indeed!

Kurt Andersen, Inside – The spy as insider

Kurt Andersen has inhabited just about every corner of the media business, having served as editor-in-chief of *New York*; author of a novel, **TURN OF THE CENTURY**; producer of pilots and specials for ABC and NBC; writer of stage productions; a columnist or contributor to several other publications. In earlier days he co-founded *Spy* (with current *Vanity Fair* editor Graydon Carter and Tom Phillips, later ceo of *Deja.com* and 1999 PC Forum speaker) and served as *Time*'s architecture critic.

Andersen's latest venture, *Inside*, is a hybrid online/offline operation covering the media and entertainment world from – as one would guess – an insider perspective.

“What we aspire to be is that fraction of *The Wall Street Journal* or *Fortune* that is about these businesses,” he says.

“We started this because we wanted to read it,” Andersen says. Inside’s parent company, Powerful Media, launched in late 1999, at the height of the Internet boom. The company had an impressive pedigree: Its other co-founders were *Spin* editor Michael Hirschorn and Brill Media Holdings president Deanna Brown, both veterans of several magazines. Closing its second round just as the skies were darkening over the technology sector last spring, Inside was funded by Flatiron, Chase Capital, RHO Partners, Goldman Sachs, Lehman Brothers and Jupiter Communications. Yet most Internet-based observers found something a trifle... old-fashioned in the company’s vision. “It was a media business plan rather than an Internet business plan,” Andersen acknowledges unapologetically. Inside operates an eponymous print magazine (in partnership with the *Industry Standard*) alongside its own Web-based efforts, and is also expanding into conferences.

If the Web doesn’t replace print, then, what does it change? “It requires a significantly nimbler, subtler view of what you are doing,” says Andersen. “Unlike magazine editing or creating, where it is possible to coast, we have not reached that level of maturity in new media.” He continues: “You really do have to start thinking of yourself as a journalistic organ that will serve up this stuff however people want it... and in ways that will make money.” The idea that online content could eliminate the distribution costs associated with print was unrealistic, Andersen argues, because it ignored the new costs and limitations of operating in the new medium.

“As a business, online is just another distribution channel. As an operation it’s very different,” thanks to the speed and viralness of online content, Andersen says. The two sides of Inside play off each other, he explains. Inside.com overwhelmingly covers the old-economy publishing, music, TV and film businesses, whereas *Inside* the magazine is heavily weighted towards technology coverage. Why the dichotomy? “Because the ‘old economy’ businesses are mature and profitable, people working in them have a need for deep, timely news and data... for which online is the perfect medium,” says Andersen. “Whereas analysis of how the businesses are changing and where they’re headed in the future – as a result of technological innovation and otherwise – requires longer-form reporting and writing... i.e. print.”

Financially, Andersen says, the big difference for a media company in the Internet era is that revenue lines on the balance sheet become uncertain. That makes having the relatively predictable cash flow of offline subscriptions as one revenue line very

valuable, though Andersen is under no illusions that subscription fees will work for most online content. Online or off, subscription models work best when the audience feels it gets some tangible benefit. In the media realm, Andersen points out, people pay hundreds of dollars per year for publications such as *Variety* and *Publisher's Weekly*. "I love *Slate*, and I paid a subscription when they required it. But you don't feel like reading it improves your career prospects," says Andersen.

What can we learn from the grand experiment of online media so far? "Given how big a deal the Internet is and how long the Web has been around, it's kind of shocking how few digital media sites there have been of any scale," notes Andersen. Perhaps more surprising, he says, is that most of them are pretty good. "You'd think frankly that there would be more bad ideas."

Rob Glaser, RealNetworks - Keeping it real

Rob Glaser started RealNetworks in 1994 after leaving Microsoft, but his interests in interactive media go back further. "When I joined Microsoft in 1983, the thing I was interested in was the convergence of media and technology, even then," he recalls. He managed Microsoft Word for a time, then moved to the networking group to get a better understanding of the guts of the infrastructure supporting services such as digital media. Eventually, he became vp of multimedia and consumer systems. Microsoft saw the opportunity of building multimedia into the operating system, but the network-based media Glaser envisioned conflicted with Microsoft's desktop software-driven economics.

Upon further prodding, Glaser admits it was all Pat Robertson's and Jerry Fallwell's fault. Explains Glaser: "In the 80s, when cable TV first started, I was pissed off that the main beneficiaries of that movement were the televangelists. I thought, in the next go-around, if there is an opportunity to create a new medium, I want to be a part of it. And I want to propagate a broader set of values." Real was originally called Progressive Networks, reflecting Glaser's social concerns.

Despite the ever-present competitive threat of his former employer, Real has remained in the dominant position in the expanding streaming media market. Its player software is now used by 170 million unique registered users worldwide and loaded on 90 percent of US home PCs. Millions of people use Real's software to enjoy everything from college basketball games to movie trailers to music. The company is agnostic about datatypes, servers, transport networks and end-user devices, having signed deals with non-PC hardware vendors such as Nokia, Sony, and HP.

Glaser recognizes that the digital media revolution is very much unfinished. "Real-Networks' thesis has always been that everything is going to be either IP-based or IP-enhanced. But I'm surprised by the extent to which that is not conventional wisdom," says Glaser. The trouble, he says, is that at a cultural level the Internet and media worlds remain very distinct. The battles over Napster and related technologies are emblematic of this conflict. "There's a disconnect between the way rightsholders think about the opportunity versus the way technologists think about it," he notes.

The problem is especially significant when you look at it globally. "The Internet opens up distribution on a global basis," explains Glaser, "but the whole rights world has been based on gerrymandering rights per territory." He is quick to clarify that geographic or temporal distribution "windows" for content such as movies are not bad *per se* and that Real's software can support such restrictions. Rather, he argues, the issue is that "the Internet opens up so many new distribution opportunities that sometimes the mindset of the rightsholders is to put their heads in the sand rather than figure out how to rapidly harness the Net's potential."

For these and other reasons, established content creators and network-owners such as cable operators and telephone companies have so far been slow to embrace IP-based distribution. But Glaser sees reason for hope. "I happen to think that the catalytic event of bringing the two worlds together is going to be AOL Time Warner," he says. Because of its cable, content and online assets, the combined company is uniquely positioned to push the convergence of television and the Internet. Even without the competitive threat of the new juggernaut, Glaser argues, network owners will have to realize the economic benefits of using one architecture for both data services and media.

In this environment, Glaser says, Real will be both a facilitator and an arms dealer. "We're enabling an architectural shift at the entertainment node, using the PC as a bootstrap," he explains. By offering server infrastructure, client software and branded content services through its Website, Real hopes to create a virtuous cycle of usage. It can afford to give the player software away for free because that drives scale that sells servers and also premium services. In five months of availability, the company's Gold Pass content offering has signed up 150,000 subscribers at \$10 per month who pay for access to premium content. Glaser sees room for competition on both the infrastructure and distribution side of the equation, though when it comes down to it, only a few companies – AOL, Microsoft, Yahoo! and Real – have the scale to be leading global distribution players.

Martin Nisenholtz, New York Times Digital - Changing Times

When Martin Nisenholtz joined *The New York Times* in 1995 to run its Internet operations, he already had a long history in interactive media, starting in 1979 when he joined the faculty of what became the Interactive Telecommunications Program at New York University.

In 1983 he went to Ogilvy & Mather, where he founded the Interactive Marketing Group. He remained there 11 years, even though the first wave of interactive services collapsed in 1986. The experience was instructive, he now recalls: "What happened in 1986 is very similar to what is happening now. All the big media companies who wanted to protect their earnings-per-share targets exited. Yet that was when this little company called Quantum Computer Services got started." (Quantum is better known by the name it adopted later: America Online.)

When the Internet started to take off in 1993, the big media and advertising companies such as Ogilvy were similarly hesitant to make a significant commitment to the uncharted new opportunity. Nisenholtz left, joining Ameritech during the brief shining moment when telephone companies represented the leading edge of convergence with their ambitious "video dialtone" projects. As Nisenholtz discovered, though, a big slow telephone company with an interactive media operation was still a big slow telephone company, so after some persuasion he jumped at the opportunity to help bring the revered but stodgy Gray Lady into the digital world.

Though he now works for a content company, Nisenholtz's views are colored by his time at Ogilvy. From an advertiser's perspective, the term "media" is not necessarily synonymous with content. "Having grown up in an ad agency for at least part of my career, what the professionals think of as media tend to be those that are advertiser-supported," Nisenholtz says. "An important core competency for any media company is the ability to monetize its intermediary position as an audience aggregator."

The basic issue for electronic media companies today, Nisenholtz argues, is that the value of their intermediary position is being thrown into doubt by the explosion of choices in a digital world. When there were only three broadcast networks reaching the entire US population, the value of those networks as a marketing channel was self-evident. Today consumers have many more choices and can switch between them at will... a challenge the Internet greatly exacerbates. "The advertiser is confused," explains Nisenholtz. "They don't know what to make of this options-based world. Products like Tivo and ReplyTV are the tip of a very big iceberg."

After this unsentimental, marketing-dominated logic, what comes next is a bit of a shock. "I see the Internet as a technology of freedom," Nisenholtz declares. "What I always hated about the broadcast networks was the utter control they had over the channel space." The great paradox of interactive media, he points out, is that the same freedom that gives readers and viewers many more choices, simultaneously calls into question the viability of the media business model. "Long long term – 15 to 20 years out – unless we define an intermediary position [for media companies], we won't have a free press," he predicts.

The challenge is particularly acute for publishers such as *The New York Times* that have made their reputation based on the quality of their content. That quality doesn't come cheap. If readers had to pay full freight for the *Times*' network of reporters, editors and bureaus, without the subsidy from advertising, the daily paper would cost six or eight dollars, a price that would doubtless cause readership to plummet (and the cost per reader to rise further). Nisenholtz and his team are determined not to let that happen, by finding a model that supports quality advertiser-supported content in the open world of the Internet. During the boom years of the Internet industry, he was often recruited to run other online content ventures, but his belief in the value of the *Times* as an institution kept him there.

Though the *Times* is known for its internally generated content, Nisenholtz has aggressively incorporated community features into its online offerings. He acquired discussion technology vendor Abuzz (SEE **RELEASE 1.0**, MARCH 1998) and also launched a local city guide, NYToday.com. Monetizing discussion-board traffic has been difficult so far. Yet Nisenholtz remains committed to building a business that combines interactivity and choice with the best of traditional media. Or as he puts it: "The question is, 'where is the space between the telephone and the television?'"

Megan Smith, PlanetOut – Building on community

"New media is about people talking to each other, not really about publishing to customers," says PlanetOut president Megan Smith. PlanetOut is the leading online content and community provider for the gay and lesbian community. It is merging with Gay.com, the other major player in the space; the combined company has 2.2 million registered users and over 4 million monthly unique visitors. In addition to its own sites, PlanetOut provides content and manages gay and lesbian discussion forums for AOL, Yahoo!, MSN, NBCi, RealNetworks and ICQ.

Smith emphasizes the interactive and community-oriented aspects of PlanetOut's offerings, seeing the company as more comparable to AOL or Yahoo! than to *The New York Times*. (As noted above, though, Nisenholtz might disagree!) "We have various contributors and writers who are creating original content, but we're largely what communities and constituents want to say to each other in the various communities we create," she explains. In contrast to a traditional publisher, Smith says, "We're much more like a cyber-neighborhood. I don't think a neighborhood is just its café or just its bar. It includes the movie theater, the Blockbuster Video, the newspaper... and the homes which have private information."

Smith, who worked at Apple Japan and General Magic before joining PlanetOut in 1996, was originally trained as a mechanical engineer. As a graduate student at MIT, where she received her master's degree in 1988, she did part of her work at the Media Lab. "There was this striking difference between the communities of those two departments at MIT," she recalls. "The Media Lab community, because of email, was totally connected... whereas the mechanical engineering department was highly balkanized." Though it was long before the mainstream arrival of the Internet, Smith says the experience taught her how powerful interactive communications tools could be in forming and nurturing communities, knowledge she has put to work at PlanetOut. "The companies that will grow and expand in the digital space will be the ones that embrace interactivity in a big way," she argues.

"New media is all about open systems," Smith says. She elaborates: "Open systems in its broadest definition – not just technology platforms and HTTP, but anyone on the planet having the possibility of participating." Interactivity goes beyond the now-standard discussion boards and chat rooms, according to Smith. For example, PlanetOut develops community leaders who are passionate about particular topics and gives them space to encourage discussions. Users in cities such as Philadelphia, New Orleans and Denver have started regular offline meeting groups of up to 200 people. PlanetOut also creates virtual events that stimulate online activity.

But can all this support a viable business? Smith sees online media companies adhering to the age-old formula: aggregate large-enough and targeted-enough audiences, and you will be able to charge companies for the opportunity to market to that audience. "If this is where people are, we need to evolve the advertising industry and the sponsorship industry to be able to reach people where they are," she says.

Smith envisions PlanetOut doing for the gay and lesbian community what the American Association for Retired Persons has done for older Americans and Black

Entertainment Television for African-Americans. By bringing enough people together, it could be an effective channel for hard-to-find services such as domestic partner auto insurance or specialized travel packages. "There has never historically been any way to reach gay and lesbian consumers in volume before the Internet because of the closet and the specialized privacy needs of gay and lesbian people," she explains, pointing out that the gay and lesbian market represents over \$450 billion in annual consumer buying power in the US alone. "I'm jazzed about the opportunity to build the business side of this community, because our customers are so vastly underserved. At the end of the day what we're proudest of is that the company reduces isolation. That's an amazing thing to contribute to the world."

She concludes: "The big call to action for the [advertising and sponsoring] companies is to recognize this is different from what they know... but it isn't infinitely different!" Intermediaries such as PlanetOut, she believes, can help marketers navigate the new terrain of cyberspace and can benefit their own audiences in the process.

LUNCH SPEECH: Our Woman in Washington

Maria Cantwell, US Senate

Maria Cantwell is a mix of many legends: poor family, a construction-worker father who became an Indiana state legislator and Chief of Staff for US Senator Andrew Jacob, and herself a state representative in Washington at the age of 28. But she brings some thoroughly modern strands to the mix: She was an effective fighter against the Clipper Chip during her first time in Washington as a US Representative from Washington State from 1992 to 1995. (You can read all about it, including the role of Ray Ozzie (PAGE 41), in Steve Levy's new book, **CRYPTO**, Viking 2001.) Then she chucked it all to join a startup, RealNetworks (whose ceo Rob Glaser is on the New Media panel, PAGE 8). And then she chucked that, took the fortune she had made, and won a seat as US Senator (D) from Washington starting this past January.

She attended the Forum last year as Real's senior vp for consumer and e-commerce, and she's back this year as a US Senator, not to give an overview of pending legislation (which your lobbyist can supply anyway), but to explain how to fix the system – not for the good of the high-tech industry, but for the good of the country. In short, you might say that the political system threatens to do to the country what the VC/IPO/public-market system has done to the tech industry. Short-term thinking and the wrong incentives can be dangerous in both private and public sectors.

We invited her to tell us what we don't get. "What the tech companies don't get is what's at stake," she says. "They don't think getting involved is very effective. This community is used to thinking in terms of return on investment, so they don't bother. But there are also costs to *not* investing. Microsoft is an example of not paying attention and the consequences."

"Tech people live in a world that moves so fast that they have almost a disrespect for the slow pace of the democratic process. High-tech executives met with senators at an outreach seminar in Aspen, and their take on it was that there are a few senators who get it, Leahy and Wyden. But they were frustrated with some senators who had not used the Internet. It was hard for them to want to talk to someone who hasn't used the Net. Yet these are the people who will be making legislation on privacy, copyright, tax policy." Ignore them at your peril.

But Cantwell is hardly an apologist for Congress or the system by which most of its members are elected. She had the luxury of using part of her own fortune (\$10 million in cash and loans) to run for Congress. "I purposely did this differently," she says. "I'm happy to elaborate on the model. I purposely didn't take PAC money or soft money. I had these resources, so I could travel around and listen to people in the state. There aren't as many differences between people in our state as you might think – between the farms in the east and the high-tech people in the west. They all want education reform and good health care; they all want low taxes."

"But they also think there's little real leadership. They want officials to stand up and say what they think is right. They want their leaders to focus on what's in the long-term public interest, not to be swayed because there are five PACs supporting something. That would be real 21st-century leadership. But instead, our system fosters expedient decision-making."

She is one of the leaders for campaign-finance reform, and for the policies it might lead to: "We're smart enough to figure out drug therapies, but how can we make them cost-affordable? One reason we haven't is because there's one pharmacy-industry lobbyist for each two members of Congress. Maybe we should do something about that. Politicians spend 80 percent of their time raising money. If you had campaign-finance reform, not only would you reduce the influence of money, you would also give politicians the time to learn what's going on. Right now, they spend their time talking to people who agree with them, and people who can supply funding."

Meanwhile, she notes, the Internet has indeed changed politics. "Information is flowing more rapidly, and constituents have more information. People are printing legislation off the Internet and handing it to me, and asking, 'Why can't you get this passed?' More people are involved; it's not just professional lobbyists anymore." The trick is to change the system so that all those informed people matter; right now, money often talks louder than information.

DINNER SPEECH: Man About the World, Man About the Net

Carl Bildt, UN/ICANN

Carl Bildt, Prime Minister of Sweden from 1991 to 1994 and more recently a civilian peacemaker in the Balkans, may have some useful advice for Bill Clinton on how to reinvent himself. Without disowning his past, Bildt is rapidly gaining credibility in the high-tech world not just as a government supporter of things technical, but as an actual participant. He sits on the boards of tech companies such as startup Humany (online support delivered by people); IT Provider (a VC fund); Melody Interactive Solutions (mobile Internet); and HiQ (a Nordic IT and telecom consultancy). His wife, Anna Maria Corrazzo Bildt, has her own Website (www.italiantradition.com) and a credible business model – selling Italian foodstuffs not to jaded Italians, but to globalizing Swedes who can't find parmesan cheese at their local grocers.

Now, in addition to his involvements with commercial startups, he is chairman of the At-Large Study Committee, a quasi-independent advisory group set up by ICANN to evaluate its At-Large membership policies. *[I serve on that committee. – ED]* His experience in the Balkans may well prove helpful!

To all these roles (and several others) he brings a long history of supporting IT and private enterprise in various forms. "I started out very briefly in banking," he says, with just enough of a British accent to sound elegant, "but that is hardly to be mentioned. Where I really come from is the university activism of the late 60s – but from the other side. I was not in favor of the Communist Revolution. In fact, I was distinctly skeptical, and there were enough people who agreed with me that I started to win elections." After a time in student politics, he was hired as a senior advisor in the non-socialist government formed in 1976, and became a Member of Parliament in 1979. He remains there, having been reelected six times since then. During his term as Prime Minister in the 90s, he negotiated and signed Sweden's entry into the European Union, and helped reverse its position as Europe's leading welfare state.

“I first noticed the Net in the early 90s,” Bildt recalls. The country was already one of Europe’s most wired, with high PC penetration (due in part to Ericsson’s earlier efforts to compete with IBM in the PC business), and a highly deregulated telecom infrastructure (starting in 1992 under Bildt).

“In early 1994, I started to send out a weekly email newsletter to those who wanted it. At first it was just to inform the MPs, but then I thought, why not make it an open list for anyone who wanted to hear from the Prime Minister? That got the PM in question – that was me! – in trouble with the law. We had a very strict, old-style data-protection law at the time. You needed government permission to have any file of names in a computer. When someone pointed out that my list was a violation of the law, we had to go in to the relevant authorities to get permission. There was a fear of a computer version of Stalin, but of course this approach made no sense once we got beyond mainframes to PCs and anyone could keep a list.” (You can read the current instantiation of his news, in Swedish or English, at WWW.BILDT.NET.)

Later in 1994 he launched the national IT commission, aimed at capitalizing on Sweden’s early lead. From PCs, Ericsson moved on to cell phones, and the commission considered various ways to foster Internet use. In 1995, the government started offering tax benefits to employers who gave their employees computers and Internet access at home – but only if they made the same offer to every employee, not just to management.

“But by that time,” notes Bildt, “I had already disappeared into the Balkans. There I set up a net with technology and satellites that was superior to what NATO had.” He made friends with many of the local student/NGO activists (including Radio B-92), echoing his own past in a strange way. More officially, working first as the representative of the European Union and at the Dayton peace talks, and then as the first International High Representative in Bosnia and now as Special Envoy of the Secretary-General of the UN for the entire area, he was responsible for a lot more than tech policy – basically acting as the leading civilian negotiator in one of the most fractious, intractable situations of the modern world.

Now he divides his time between strategic advice to the UN on Balkan peace issues, involvement in the rapidly growing Nordic high-tech sector and other duties such as, for now, the ICANN study.

T U E S D A Y , M A R C H 27

PANEL: The Transformation of Communications – Will the Net Swallow the Phone Network? (KW)

For years the communications industry has been talking about a revolution. Interactive television was going to transform the telephone business; then it was voice over IP; then broadband; then wireless data. Deregulation would free established companies to innovate and open up opportunities for aggressive startups. Data traffic and capacity were growing so fast that voice would soon be nothing more than a blip, given away for free.

It hasn't worked out that way. At least, not yet. The communications landscape has changed dramatically through mergers, competitive shifts and the rapid growth of wireless services and data-networking vendors. Yet most people still use the same phones, over the same kinds of networks, through the same carriers (albeit with different names) as they did a decade ago. The voice and data worlds remain largely separate, eyeing each other warily across the circuit/packet divide.

Something has to give. How will service providers bridge the gaps – technical, business and cultural – between voice and data? Will carriers go away as users define their own services and connect to one another directly? (...Or is that question best left to the P2P roundtable?) What kinds of services will speech recognition make possible? Will we all throw out our landline telephones and Internet-connected PCs in favor of mobile devices? How these infrastructure-level questions are answered will define what's possible for the businesses and consumers everywhere who use communications networks.

Ron Croen, Nuance Communications – Speech, the final frontier

Ron Croen wants to bring the Web's powerful network effects to bear on the stodgy world of voice communications. His company, Nuance (SEE **RELEASE 1.0**, MAY 2000), is the leading vendor of phone-based speech-recognition software and related technology, enabling what Croen calls "personal voice dialtone." "Dialtone is about navigation," he explains. "The application of dialtone is dialing. When you were dialing before, you were dialing to get to a known node in the network: typically a person with a phone and a phone number associated with that phone. Now, you may have the ability to go to new points ad hoc by hyperlinking. It's the equivalent of surfing or browsing the Web."

Croen himself isn't a speech-recognition expert, though he was smart enough to see the potential of the nascent technology eight years ago. "I was living in Europe, coming out of a decade-long experience in the minicomputer business, which had pretty much run its course by 1990 or 1991," he recalls. "I decided I wanted to come back to Silicon Valley and look for an interesting technology opportunity." He was introduced to the speech-recognition group at SRI, and came away convinced SRI had a three-to-five-year head start on others in the field.

Desktop dictation packages from Dragon, IBM and others had already hit the market. Croen saw speech recognition over the phone as a much larger opportunity. (Dragon *et al* replace the work of a person typing; phone-based systems replace the work of a person listening.) Croen served as a consultant to SRI as it spun off the speech-recognition technology into Nuance, taking over as president when the company was established in 1994.

"The technology had been promised for over 20 years, but it still had never been delivered in any commercially valuable way," says Croen. Instead of creating technology for its own sake, Nuance examined the business opportunities that would lead companies to deploy speech recognition. The paradigm case was a stockbroker such as Charles Schwab (Nuance's first major customer), which had thousands of agents in call centers giving real-time quotes to customers. By deploying Nuance's technology, Schwab was able to avoid the \$25 million in real estate, staffing and other costs associated with building a new call center.

Starting with its speech-recognition engine, Nuance has built out a product line including tools, a "voice browser" for a common navigation interface, voice authentication and a voice application server. It is also pushing into new areas such as phone-based instant messaging with its recent acquisition of SpeechFront. "Instant messaging isn't mainly about messaging; it's mainly about presence. Think of introducing presence information into the communications experience," says Croen, envisioning a scenario in which callers would know when their buddies came on the network as they do with Internet-based instant messaging today.

Nuance has been one of the proponents of VoiceXML, a scripting language for creating voice applications. Croen sees the use of Web technologies and standards such as VoiceXML in the phone world as part of a deeper change to a computer-industry model – horizontal segmentation of vendors, with developers at the edges free to create applications that run on the network – in contrast to the vertically integrated, carrier-controlled environment of the past.

Carriers today face a choice, Croen says. If they continue to deliver basic voice dial-tone as they always have, revenues will continue to decline as voice becomes more of a commodity. AT&T, Worldcom and Sprint have all recently announced disappointing results for their traditional long-distance businesses, and Croen sees other competitors looming as even greater threats to such carriers. "It's about who owns the customer and who owns the traffic – the time on the phone of the customer. Tellme and others including AOL, Lycos and Yahoo! will be happy to take it from them."

The alternative is for carriers to offer enhanced services based around speech recognition, which help them differentiate themselves and create new revenue opportunities. Nuance is more than happy to help them do so: In addition to serving voice portals such as Tellme and enterprises such as American Airlines, UPS and Home Shopping Network, it recently launched a voice-based dialing application for Sprint.

Judy Estrin, Packet Design – Clouds and strings

Judy Estrin and her husband Bill Carrico have started and sold three Silicon Valley technology companies – Bridge Communications (sold to 3Com), Network Computing Devices and Precept Software. When Cisco acquired Precept in 1998, Estrin stayed aboard as Cisco's cto, a post she held until April 2000. Returning to the startup game yet again, Estrin decided what the world needed was not another product vendor, but a company that could tackle the deep issues in networking directly. "We believe there are a lot of hard problems that need to be solved as we move the Net further, but there is something of an architectural vacuum now," she explains.

Estrin's goal with Packet Design is to fill the gap between academic networking research and internal development projects at technology companies. "We apply research techniques to problems that exist today, in order to provide solutions that are more scalable and have more longevity," she explains. Much of the early networking research that led to the Internet started in university research labs and was commercialized later. ARPANet and NSFNet were themselves government-funded university-led research projects. Today, however, the research labs are looking further and further out into the future.

At the same time, corporate R&D departments are ill-prepared to do the kind of work that Estrin believes is needed to evolve the Net beyond its current state. The fast pace of growth in the networking world over the past seven years has created an environment that emphasizes time-to-market over all else, sometimes to the detriment of approaches that ultimately offer better scaling. Moreover, in large compa-

nies, the research groups tend to be isolated from the product-development people and from customers. “I can tell you so many stories of corporate labs that haven’t worked,” says Estrin.

To overcome these obstacles, Estrin developed a unique model for Packet Design. “It’s not exactly like anything else out there,” she says. “We created Packet Design to be a technology company, not a product company.” Packet Design will identify areas of need, create projects and, working closely with potential customers, develop the ideas through prototype. If it believes a product is viable, it will either license the technology or spin off a new company to bring it to market. Packet Design is incorporated as an LLC; its employees will receive stock options that flow through the value realized by Packet Design’s equity in the spinoffs. In addition to Carrico, who serves as Packet Design’s chairman, the company’s founders include chief scientist Van Jacobson, developer of the Internet’s primary congestion-control mechanisms.

The problems Packet Design will tackle include evolving routing and IP. “Note, I didn’t say replacing,” Estrin quickly adds. “We absolutely believe the basic architecture of the Internet is the right one. We are now asking it to do things it wasn’t meant to do... whether it’s telephony, quality of service, optics, security or mobility.”

The convergence of the voice and data worlds is particularly challenging. Says Estrin, “The whole notion of bringing the Internet and telecom together: What you really want is the best of both worlds, but you run a risk of getting the worst of each if you’re not careful.” She elaborates: “The reason the Internet has grown the way it has and scaled the way it has is because it has this distributed architecture that I describe as an architecture of clouds. You just need to hook onto a peer somewhere and you’re connected to the whole network.”

The telephony world, in contrast, thinks in terms of wires or “strings”: individual point-to-point data flows. Multi-protocol label switching (MPLS), which tries to manage and prioritize IP traffic in terms of flows, is problematic according to Estrin because it imports the telecommunications model into the Internet. “Something that feels comfortable to the telcos because it is connection-oriented may also be undermining one of the key architectural aspects that allowed the Internet to scale.”

Merging the reliability of the phone world with the innovation and growth of the Internet is a big job, Estrin emphasizes. Provisioning, management and employee training are all important, in addition to fundamental technology. Will traditional telcos survive? “Some of them will,” she responds. Fortunately, she says, new entrants

using IP technology have woken up some of the incumbents, who are starting to respond to the competitive threat.

Chris Jackson, Vesta WirelessWorks - Cutting the cord

Chris Jackson's background includes stints in the British merchant navy (his pithy summary: "I went to sea. I hated it.") and the Royal Air Force, where he served as a pilot and communications officer. After leaving the military and getting his MBA at Bradford University, he joined Motorola just as the first digital cellular systems were being rolled out in Europe. He worked in various executive positions at Motorola and Nokia as those companies rode the explosive growth of wireless usage and mobile data services in Europe.

Last year Jackson joined Vesta, the London-based technology investment arm of the Sun Group. Vesta WirelessWorks, which Jackson heads, builds relationships among entrepreneurs, carriers and strategic investors around wireless technologies in Europe. It operates its own venture fund and also manages dealflow for corporations such as Cisco and Unilever. "Our focus is to work with entrepreneurs to link them with other parts of the value chain," explains Jackson. "It's their ability to get their services to market that will determine success or failure."

It's difficult for most Americans to appreciate the level of wireless usage in Europe today. And, according to Jackson, it was a surprise even to most European experts. As head of corporate strategy for Nokia five years ago, he developed forecasts of wireless growth. "We never envisaged that the penetration levels of mobile cellular could be as high as they are today," he says. Nokia predicted a penetration ceiling of 50 percent; in Finland today penetration is now 83 percent.

The reason for the low forecasts, Jackson explains, is that they assumed business users would be the primary drivers of mobile telephony. Instead, it turned out to be teenagers. "When I was living in Finland two to three years ago, it was pretty common to see kids 11 years old walking down the street with a phone," says Jackson. Today most of Europe has reached the same point: "We're at the stage where most 13-year-olds, if they don't have a phone already, they get one." Jackson sees similar usage levels coming eventually to America, but so far the big limitation has been the patchwork of US wireless standards, in contrast to the pan-European GSM.

While wireless usage has grown rapidly in Europe, PC-based Internet penetration is still significantly lower than the US. Many Europeans use mobile phones as their pri-

mary Internet access devices. Where teenagers and other heavy Internet users in the US engage in instant messaging, their European counterparts send short message service (SMS) messages between their phones. More than 20 billion SMS messages are sent every month in Europe, generating a significant revenue stream for wireless carriers, who generally charge usage-based fees. In addition to messaging, Jackson identifies location-based services, mobile e-commerce and voice-based services using speech recognition as major opportunities in wireless data.

“Negative pundits say you can’t get the Internet on a mobile phone,” he says. “You need to qualify that. You can’t get SVGA graphics on a mobile phone, but you can get information on a mobile phone.” Even with the limited bandwidth of today’s wireless networks, he notes, “You can distill the vast majority of these applications into content which has low bandwidth.” And more bandwidth is coming. “When we get General Packet Radio Service (GPRS), which will give us higher data rates fairly soon,” says Jackson, “I think we’ll start seeing the early stages of music downloading, and some of the similar patterns that we see on the Internet adopted.”

Beyond GPRS, third-generation (3G) wireless standards promise significantly higher bandwidth than is available today, and carriers are investing huge sums in the spectrum licenses and equipment needed to roll out these technologies. Though recently there have been concerns that 3G won’t live up to its promises and won’t generate enough revenue to justify the expenses, Jackson says most carriers have no choice but to press forward: “So much is riding on 3G, and the expectations have been set so high.” Those companies who purchased licenses are effectively losing money every day until they deploy the service, he points out.

Notes Jackson, “The big dilemma for the operators is: Are they going to be a driver of new applications and services, or are they going to be a pipe? The operators clearly want to own the customer, as they do today, but that will be increasingly difficult.”

Eric Sumner, Dynamicsoft - SIP, SIP... Sooray!?!

Sometimes, seemingly obscure technical protocols change everything. HTML made it simple to author content online and unleashed millions of personal and commercial Websites. XML is giving businesses a standard framework to tie together systems and applications, opening up the opportunity for business-to-business e-commerce. In the telephony world, the great enabler is the session initiation protocol (SIP), a simple language developed at Columbia University for creating applications that control the operation of telephone networks and their associated devices. SIP brings

the Web model of horizontal industry segmentation and open platforms for application development at the edge of the network to the formerly closed, proprietary, centralized world of telephony.

Successful protocols need corporate champions. If those champions play their role right (as with 3Com in the early days of Ethernet), they can support a vibrant open marketplace while maintaining a dominant position by virtue of their experience and expertise in the space. SIP's champion is Dynamicsoft, a three-year-old New Jersey-based company that employs most of the protocol's architects.

Eric Sumner became ceo of Dynamicsoft last year after 15 years at Lucent and AT&T Bell Labs. Sumner's Bell roots run deep: His father worked at the famed research organization for more than 40 years. Yet he found the Dynamicsoft opportunity, and the potential to change the very structure of the communications industry, too exciting to pass up. "If you were reasonably creative and in communications, opening up the network has been a dream since the early 90s," he says.

At Bell Labs, Sumner started a research group in 1991 to investigate better ways to develop large software systems. Among its efforts was a project to simplify the development of interactive voice response (IVR) applications, the formal name for telephone keypad-based recorded-voice information services. "Traditional IVR systems are expensive and hard to modify and you have to learn some arcane language to program them," Sumner says. Sumner's group created a domain-specific scripting language to separate the application logic and content from the proprietary telephony systems underneath. That language was the predecessor to VoiceXML, which has become the standard for creating voice-based applications powered by vendors such as Nuance (SEE PAGE 19).

Now Sumner and Dynamicsoft are seeking the same level of industry buy-in around SIP. "New services on the traditional network are incredibly difficult and expensive to build," he explains. "You have to learn all kinds of arcane languages, and you're not leveraging the Web." SIP removes those barriers and provides a common protocol to tie together offerings from many vendors. More than 60 companies now participate in SIP interoperability events.

Sumner believes that open protocols such as SIP will drive fundamental changes in the structure of the industry. "You can converge IP and telecom and have it look like telecom with new protocols. Or you can converge IP and telecom and have a telecom

industry that looks like the Internet industry, with relentless specialization and lots of new companies,” he argues.

“The level of innovation in the industry is a function of how high the barriers to entry are for creating new services,” Sumner explains. “We’re extending the servlet interface to handle voice, video and presence in addition to the Web. There are 3 million people graduating from college who know how to develop servlets. They can now all develop communications services.” Moreover, SIP breaks the monopoly carriers have over the services available to a user. “Today we offer telecommunications services based on your access point,” says Sumner. “The architecture [of the Internet] is set up so that anybody with IP connectivity can access any IP service.” SIP brings that any-to-any environment to the telephone world.

Dynamicsoft licenses software to service providers that allows them to create, host and manage SIP-based services. It also sells to hardware vendors and developers that deploy infrastructure and services at the edges of the network, including voice over IP gateways, softswitches, unified messaging platforms and IP-based phones. Some customers such as Level 3 use Dynamicsoft’s technology for basic voice services, while others such as Lipstream and Webley create more complex offerings such as click-to-talk e-commerce and personal assistants.

Sumner is excited about the open telecom future: “We will know we’ve succeeded the first time a couple kids create a new service and it catches people’s imagination.”

PANEL: The Changing Balance of Power – The Market Talks Back (ED)

The great promise of the Internet is that it gives power to the little guy. But that means far more than letting a consumer choose freely between the same books at different prices on different Websites, with tools to make her a smarter shopper. It means genuine two-way communication, allowing the individual to define herself as a producer – of words, of opinions, of structures. It used to be that the power of computing was in the hands of big companies and “MIS” (management information systems, remember them?) organizations; now it is in the hands of individuals.

Services that were once offered in large companies are now available, at “retail,” to individuals – whether it’s rebooking an airline flight or communicating with a customer

across the world. EBay is creating a whole new generation of small-time merchants, able to reach as large a market as they can supply.

But there's more to it than that. "Collective action" used to mean things like forming groups and coalitions – electing governments or representatives and abiding by their rules. It's the theory behind governments, taxation, labor unions. But with the iterative ability of software, collective action is now more complex and granular than that. It's not individuals acting as a group; it's individuals interacting within a group. Now individuals get a chance to define the rules and the systems they create. With the right local rules and tracking mechanisms, users together can form interesting information services of their own – everything from Amazon's rankings (how many other people bought this book) and Epinions' user reviews, to the swirling reorganization of Plastic's content according to its users' selections. Epinions lets its users monitor one another, while Maria Cantwell's campaign Website allowed users to monitor her.

In the business world, meanwhile, B2B exchanges are changing the landscape, often in unexpected ways. Their transparency allocates market power according to reality: Is there too much product, or too little? Dynamic pricing manages this in realtime. Meanwhile, the visibility of offerings helps the little guy get noticed, but it does not replace the trust built up between partners over years of collaboration – or of golf.

The change in the balance of power does not mean everyone will become president – of a country or of Microsoft. Instead, it means that, in the long run, the president and Microsoft will matter less. They will get their power from the voices of their leaders and their communities, rather than from the size of their institutions. The point is not to have power over, but to have the power to....

Mark Hoffman, Commerce One - B2B plumber

Mark Hoffman came to Commerce One from Sybase, which he co-founded. He didn't quite start Commerce One, which began as DistriVision, but he gave it its identity. DistriVision sold software to help suppliers' sales efforts; Hoffman took that software and transformed it into an e-commerce platform.

Commerce One's mission is to build infrastructure for, not to run, marketplaces. Says Hoffman: "I'm a big believer that exchanges will be created by major buyers. We've never gone out and created a market on our own. Our goal is to recruit large buyers, or consortia of buyers, and then let them create marketplaces themselves, with our help of course. They can jump-start the exchange by putting their own very

large procurement budgets through it. We're different from the other B2B dotcom startups who said, 'We're going to start an exchange and get people to trade in it'."

In a resource-rich world (at least in developed countries), the buyers have the power. Adds Hoffman, "And now, by automating their spend, they can pull in suppliers and even get a return on the investment. If they can bring in others to the exchange, it's a really powerful model." He continues, "Today, quite frankly, the buyers take a pretty dominant role in starting these marketplaces. But in the end there needs to be a win-win for all the participants."

"I look at both buyers and suppliers as my customers," Hoffman continues. "The suppliers have to be happy and feel that they're going to get a good ROI themselves. The sellers get the benefit of an effective market for their offerings. Ideally, a marketplace gives a supplier, even a small supplier, more power.... They get better contact with customers, more interaction and communication. A smaller guy, if he actually *is* better, can take advantage of this. And some of the big guys – it's appalling – aren't as good at getting wired."

"The customer has control," says Hoffman, "but only if he has a big budget." Of course, this creates a conflict when the owners of the market are the buyers: They may be more interested in keeping prices low than in making the market itself profitable. (It's even more complicated in the other direction, when the owners are sellers. That's when the Justice Department really takes a look, as in the case of Orbitz, below; the market has to ensure that all pricing decisions are made discretely by individual sellers.) The trick is to make the ownership structure mimic the allocation of business so that everyone's interests are aligned, but that's complicated. One participant may be more interested in low prices, while another wants to expand into services that are not immediately profitable. Those are business decisions, but not everyone has the same business interests or strategies. For example, the largest shareholders are likely to be the most risk-averse.

Commerce One itself also benefits from the success of the marketplaces it fosters: It tends to charge relatively low upfront fees and then take equity and revenue-sharing participations.

Meanwhile, Hoffman asserts, the middlemen may not be as badly off as popular wisdom suggests. "Even as exchanges proliferate, I'm still seeing the role of the middleman preserved. There was value when they did it on paper, and they're still valuable today. We thought a lot of these distributors would not be as powerful, but they play

an important information and aggregation role. Even today, people want someone to aggregate in either direction – for office supplies, for example, or for selling to a fragmented market. Their service has value.”

Of course, Hoffman notes, he is sensitive to antitrust issues. “But I’m not a subscriber to the theory of a collapsing number of exchanges around the world... I don’t think it’s a winner-take-all game. Each vertical market has its own content and syntax, and each operates in a variety of geographies, with different services required. All this means that the markets will not all consolidate into one per industry. I believe there will be thousands of marketplaces around the world providing their expertise. You also need to provide an infrastructure between these markets, so that people can communicate across markets and interact. We call it the global trading web.” And at least in theory, any market that abuses its power or works poorly will lose members to a competing exchange.

Within the markets, he notes, “There’s usually very little government interference or regulation. Our view is just go execute, and if someone wants to stop us, they’ll come and do that. We just can’t wait for governments to create regulations around electronic commerce. On the other hand, the large companies, especially in the US and Europe, are very concerned about privacy and aggregation of data. They want to stay on the right side of the issues.”

What about trust? Hoffman’s view is that it’s not the exchange’s job to create trust. “In our case, the buyer is the one who establishes the initial relationship with the supplier. Our markets don’t do that today. I think there will arise services around us that do that kind of thing – rate the suppliers, for example.”

“In our case, we attacked the procurement issues first because we felt that this was the easiest place to get traction, but the goal was to automate intercompany transactions. Now we are looking at more complex transaction types such as sourcing, auctions, services, logistics, other types of added-value business services.”

Steven Johnson, *Feed/Automatic Media* - Plactical man

When Steven Johnson asked me to write a blurb for his newest book, I realized that he was the perfect person for this panel, both practitioner and pundit. But before I go on, here’s the blurb: “In **EMERGENCE: THE CONNECTED LIVES OF ANTS, BRAINS, CITIES, AND SOFTWARE**, Steven Johnson doesn’t tell you a lot of things you didn’t already know (assuming you’ve played a video game, wandered through an urban neighbor-

hood or visited the Web lately). But he makes you understand a lot of things you may not have asked: Why are kids so comfortable with complex discovery games? Why are the NGO protests – against the WTO, the World Economic Forum and the like – resonating so widely? How can Websites foster trust when their visitors don't know one another?" And then of course there's all the stuff about the ants....

In addition to **EMERGENCE**, about the rules of programming and of society that form emergent structures, Johnson also wrote **INTERFACE CULTURE: HOW NEW TECHNOLOGY TRANSFORMS THE WAY WE CREATE AND COMMUNICATE**, published in 1997. Call it texture followed by structure.

That's the pundit part. As for practice: In May of 1995, Johnson left his graduate studies in English literature at Columbia to co-found *Feed* Magazine, the "first online-only magazine with real writers." (*Salon* followed in July 1995, and *Slate* in June 1996.) Johnson ran *Feed* with co-founder Stephanie Syman for 18 months and then got funding from investors including me (through a presentation at the New York New Media Association, as it happens). Since then, the company has worked on an advertising-based model, keeping its costs low because its esoteric content never caught the imagination of mainstream VCs. Last year, in a complex merger funded partly by Lycos (now Terra Lycos), it merged with Suck to create Automatic Media, which aims to create "audience-centric media properties."

A month ago, putting Johnson's ideas about emergence to the test, the company started Plastic, a Weblog based on the Slashdot.org software. "We did it," says Johnson, "because we were so blown away by Slashdot. If it was so good for the Linux community, why not try it on a different community?" Plastic itself says (on its site), "Operating somewhere between anarchy and hierarchy, Plastic is a live collaboration between the Web's smartest readers and the Web's smartest editors..." But fairly soon, the editors can leave it all to the users, if Slashdot's experience is any guide. Says Johnson: "We'll give them the tools and let them drive, and then see where they take the car!"

Like Slashdot, Plastic allows people to post, to rate others' postings, and to rate their rating skills. As Slashdot's experience has shown, Johnson says, "the feedback mechanism enables the site to scale without compromising the signal-to-noise ratio, unlike so many community sites."

What fascinates Johnson is how the rules determine the outcomes, but not one to one... just as a few genes, it turns out, can create many more proteins, which in turn

create a seemingly infinite variety of human beings – or roundworms. It's not the medium or the message, he says; it's the rules.

So, though Plastic looks to be a nice commercial proposition, with 400,000 monthly visitors after one month and only two full-time editors, Johnson is also interested in it as a sort of science-exhibit ant farm. For example, do such systems foster high quality at the expense of diversity? How can you encourage the equivalent of speciation by getting people to focus on different topics, and rate raters within those topics? The pottery expert, for example, may not have much to add to the conversation about politics in Hungary, or about a new operating system.

Just two weeks into its existence, Plastic started offering a Karma contest, whereby each week the person with the most "karma points" for good moderation/rating skills gets a \$150 voucher to spend at Amazon. [*Jeff, I didn't make this up!*] So now, Johnson notes wryly, "we have two fascinating threads about the impact of the karma contest on Plastic. It's a variation of [Mike] Godwin's rule: 'As a Usenet discussion grows longer, the probability of a comparison involving Nazis or Hitler approaches one.' Any self-organizing discussion will inevitably include an analysis of its own rules."

"You just don't know," he continues. "Is the whole thing going to turn into an online variant of *Survivor*? Will people form alliances, trade points, what have you? The good thing is that we can always turn it off...or change the rules!"

As a blurb for Johnson's presence on the panel might say: "This is just a brief sampling. What Johnson has to say could fill a book!" ...and so we have managed to get some bound excerpts to distribute to you at the Forum.

Jeff Katz, Orbitz - Making more than the price right

It's a truism that the most profitable part of the airline industry is the information business – Sabre, Amadeus, and the like. These so-called Global Distribution Systems (GDSes) manage airline seat inventories and ensure that everyone pays the highest fare he can stomach, even as empty seats are filled to generate the last possible dollar from someone who would not fly at a higher price.

Yet optimization of assets may not be the secret to happiness – something to consider the next time you want to run a multi-variate fast Fourier transform with triple regression in order to improve your customer targeting. Although optimization

results in cheap seats for the other guy – and optimal use of assets overall – it has led to an industry rife with unhappiness among both customers and employees. (Could it be that quality levels are similar in the software business, but somehow no one is unhappy yet? Never mind; that's another story!) In fact, even the airlines' owners are unhappy, and Congress is unhappy with *them*.

Into this minefield is stepping Jeffrey Katz, an old hand at the airline business, via American (including Sabre) and Swissair, and now ceo of Orbitz, a startup travel site owned by a consortium of US airlines (American, Delta, Continental, Northwest and United). At American and Swissair, he worked on behalf of each airline, optimizing its use of assets. Says Katz: "Over the last 10 to 20 years the airline industry around the world has made giant progress in using sophisticated IT applications. But the missing link in all of this has been an orientation to deal, not with the metal, but with the customers who flow through the network itself. At Swissair it became clear to me that this network view of customers – watching out for them in the same way that the airlines watch and forecast the needs of their aircraft as they flow through the network – is a long overdue mission."

He saw a way to take advantage of what the airlines spend on distribution: American alone pays \$1.5 billion to travel agents and almost \$400 million to the GDSes each year. Orbitz plans to use some of its commission-based revenues to provide superior information-based services to its customers.

Says Katz: "For Orbitz, using IT and working for the customers is how we will differentiate ourselves. We need to walk a fine line between punching the carriers in the nose, and making things happen for the customers. The current online travel market focuses on the quality of the search engine and locking up Internet portal exclusives, but this is a game of diminishing returns and not a sustainable form of competition. The new online frontier for travel will be what we call customer care for everyone – not just the most profitable 20 percent. Customer care requires balancing the needs of the traveler against the physical world of weather, aircraft and huge labor forces."

So consider this: Perhaps the most profitable part of the airline industry is a piece of it *independent* of the airlines, operating on behalf of the customers... like a travel agent, but with the IT heft and scale of an airline. And though Orbitz will of course generate the best match on price between customers' pockets and airlines' offers, it will focus more on what really affects travelers en route – all those surprises: canceled flights, lost luggage, complicated rules for upgrades.

A PERSONAL EXPERIENCE...

My own latest bad travel experience started in London: My flight to Zurich was canceled, and the later flights were fully booked with skiers. I gamed the system, though, and called my trusty travel agent, Denny Goetz. (Thanks, Denny!) One option was to rely on Swissair to book me later; another was to see what British Airways had going. Or I could blow off Zurich and go back to New York. That's what I did, and it meant canceling my flight to Florida from Zurich the next day, and booking a new one from New York. When I showed up at La Guardia airport the next day to go to Fort Myers in Florida, the Delta flight

was canceled and the new connections were chancy, so Denny booked me on an American flight to Miami as I walked over to the American terminal. My assistant told the car service "Miami, not Fort Myers," and it mostly went smoothly, except that drivers meet passengers at baggage in Fort Myers and at the gate in Miami...and no one told me. (In all this, no luggage was lost. Moreover, at the meeting I attended in Florida I found someone who offered me a spare seat in his jet back to New York, so the story ended very nicely!)

Readers: You may safely skip the story in the box above (but no one can resist telling tales of woe). You know the drill: The flight is canceled, and immediately long lines of fractious passengers self-organize in front of irritable clerks. You're on your own in the mad scramble to make other arrangements. If you're lucky, you have a travel agent....

Parse what happens when a flight is delayed or canceled: There's a web of underlying options and alternatives, dependencies between cars and flights, hotel rooms to be booked and unbooked, and little details such as where drivers wait that get lost in the shuffle. It must be possible to represent these details and options and rules in software, and execute them when something unexpected (but inevitable) happens. People with nonrefundable tickets have a limited set of options; people with first-class tickets may even rebook on other airlines.

Thus, Orbitz's proposition goes beyond good fares to using information on behalf of the *customer*: pre-trip information about destinations, traffic and other things; real-time passive information about delays and active rebookings of flights, hotels and related services; and finally, lost-luggage tracking. (I could tell you another story, but I won't.) Suffice it to say that airlines already know more about your luggage than they tell you, given automated tracking systems. Orbitz, if it gets the millions of customers it seeks, might get the airlines to use those systems to disclose a little more.

One thing is for sure: The kind of transparency Orbitz promises would raise people's confidence in the rules. It's nice to persuade the gate agent to upgrade you, but somehow the rules always seem to bend more easily for someone else. The current opacity of the airlines' rules feeds people's impression that they are being mistreated.

That's the idea, anyway, and that is why I have joined the company's advisory board.

Nirav Tolia, Epinions – Users, define your service

Nirav Tolia got sidetracked several times from becoming a doctor as his parents wanted, and now it looks final. As ceo of Epinions, he's unlikely to get the chance to go back for medical school. His interest in user content started at Stanford, where he was an avid user of Usenet – alt.sports.football.DallasCowboys, the closest he could get to his home in Odessa, Texas, and alt.music.alternative, where he sold CDs.

As a biology and English student, he heard a lot about Jerry Yang and David Filo. Though he graduated and went to work for McKinsey, eight months later he joined Yahoo!'s editorial department.

At Epinions, which Tolia co-founded in the summer of 1999 (funding from Benchmark and August Capital), the proposition was simple: taking the kind of feedback that often went nowhere on Usenet, and making it matter... both to a broader audience, and to the perpetrators of the products/services themselves. "You need some scale or weight to have an impact," Tolia says. "You can't just be one voice in a crowd." You can either be a Senator who had a bad experience on a flight, or you need a brand name such as Epinions behind you. Tolia is full of anecdotes about people who were recognized and treated well as Epinions reviewers, often because they were wearing Epinions T-shirts. (That sort of spoils the principle, which is that the reviewer should experience typical service, but it's a nice validation of Epinions' impact.) The service now has 3.5 million users each month. It is hardly a household word, but among its users are a sufficient number of hotel managers, product designers, marketers and the like to matter.

The second factor is ROI for the vendor, says Tolia: "If I fix this will I get the customers back?" Epinions provides the expectation that they will.

But, providing his own feedback to our conversation, Tolia suggests that the focus on complaints misses the point: "We're not a gripe Website, like Planetfeedback or something; we're a site that empowers consumers to make informed buying decisions. Our core competency is not empowering consumers to complain to manufacturers, but empowering them to make educated purchases. We are far more like *Consumer Reports* or Zagat's than the Better Business Bureau."

The model is pretty straightforward: Users rate their experiences with a variety of products and services, from hotels, airlines, golf courses and swimming pools, to home appliances, movies and of course computers. Users need to be registered to write reviews, though anyone can read their comments. The registered users also

rate one another, which helps to reduce gaming of the system. Moreover, the “frequent reviewers” – about 100,000 of them – are reviewed and get reputations *within* a category: If an expert on pools, for example, wanders outside her category into cars or boats, her ratings have less weight.

“But our users are not our [revenue] customers,” Tolia points out. Though the company doesn’t disclose overall revenues, it has some! ...from three sources: advertising, mostly click-throughs (e-commerce revenues, about 75 percent); technology licensing to other sites who want a similar rating service in their own particular niche (15 percent); and syndicated content sales (about 10 percent). Often the license buyers will also syndicate the content to fill out their site, and then enhance it with reviews from their own community members. These customers include Microsoft (MSN), Kmart (Bluelight.Com), Lycos, NBCi and Excite@Home.

Some day, we hope, product vendors will also constitute a large and attentive customer base – but of course they can already visit the site for free like any other user.

From a business point of view, the cost structure is cleverly constructed. Epinions has no editors and relies on its users to do most of the work; it has only five “content production” people. Compared to say, *Consumer Reports*, it only has to decide to cover a topic; it does not have to define the product features and quality measures, research the makers and the brands, or compare the products. It simply posts a topic and lets the users define it. Or, now that the foundation is established, it lets the most highly ranked reviewers specify new categories they want to launch. So far, Epinions users have added several dozen new categories, or about a tenth of the total. In short, Epinions lets its users define the service.

PANEL: Commodity Infrastructure – The Empire Strikes Back (ED)

Although much of the New Economy buzz was about small startups, much of the money and press attention is now going to the big guys. The talk is flexibility, speed, innovation... but the challenges are scale, complexity, security.

The challenges of achieving scale are old-economy in many ways: managing and motivating a large workforce, spreading a corporate ethos across many offices and cultures, etc. Size also fosters complexity – complexity that fashionable self-organizing approaches cannot always handle. Thus, large companies – even as they provide outsourcing services to other companies – are outsourcing their noncore functions to other outsourcing providers. Cisco and Exodus – both emblems of the New Economy’s big scale – are active outsourcers, concentrating their own internal forces on creativity, innovation... and delivery of “commodity” products and services that need to improve continually in a fiercely competitive environment.

Their challenge is to bridge the gulf between small, creative teams that produce innovations, and the need to rely on “mass process” (as opposed to production) and economies of scale. Big companies need to figure out how to “massify” the creativity within and inject innovation back into their core business. What is a cost for an outsourcing customer is a platform for innovation in a company whose business revolves around doing a particular function better and better.

That’s “design creativity.” The infrastructure/commodity companies also need “performance creativity.” Their mission is flawless performance, which means everything is carefully designed, planned, specified... Yet things always go wrong. How can well-managed companies plan for the unexpected? How can they continue to surprise us on the upside, in this world where investors expect you to surpass expectations? Groove’s technology helps individuals within companies to collaborate ad hoc. Tibco’s tools make it easier to figure out what is actually going on – and to modify it in realtime.

The startups and the commodity providers are the extremes. What about the middle? Perhaps it is toughest being mid-sized, with few economies of scale, but without all the energy and life of a small startup. Why do so many companies peter out in the transition from seedling to tree?

Sue Bostrom, Cisco - What's good for the Net, is good for Cisco

After two year at National Semiconductor, seven years at McKinsey and a year helping with the turnaround and sale of FTP Software in 1997 as senior vp of marketing and strategy, Sue Bostrom didn't think she wanted a job with a large company. But John Chambers persuaded her to join Cisco to create and run the new Internet Business Solutions Group, focused on defining the benefits of the Internet itself, rather than of Cisco products, to corporate clients.

She watches and coaches firsthand as large corporations discover the potential and the implications of the Internet, from cost-cutting and customer care, to employee empowerment and eternal engineering enhancements.

"They're transforming their businesses, but the focus areas depend on the business climate. Many companies want to focus internally right now. But pretty quickly they realize the potential of applications that can improve customer care and start asking, 'How do I place the bets in both areas?' Even in today's economic climate, I see people using the Net to retain customers and raise loyalty. Still, only a small fraction of companies of size have really embraced the Net. Some are well down the road like Cisco or Dell; GE is clearly headed that way. Many folks are still in the planning and piloting phase. Cisco started investing in this in 1992."

Even as it keeps its product lines growing, how does Cisco keep its people from getting stale? Every six months, says Bostrom, "We report to John [Chambers] what have we done outside the box. What creative new ideas are out there? Imagine the impossible: How can you achieve an impossible, audacious goal? And then imagine...tactical, practical implication. What do I do in the first three months? For us, the virtual close is standard; e-commerce is standard. What's next?"

In fact, this all sounds so routinely outrageous that we have to wonder: What if you took Jack Nicholson's Murphy out of the "*Cuckoo's Nest*" and put him into Cisco? Would he appreciate the company's attempts at radical thinking? Or is even the audaciousness too tidy?

Bostrom considers this. "There's a real shift in culture. People - employees - have a lot more information. Are you as a leader going to reach out and hear what they have to say? Does the leader listen to his own voicemail? Can people leave him voicemail? [Yes, employees can leave voicemail for John Chambers.] People throughout the

organization have access to trends that the top of the org chart may not be seeing, and we recognize that.”

Cisco, though it is now a big company selling commodity infrastructure, still tries to run itself like a startup, outsourcing as much as it can beyond its core competencies – engineering and marketing/sales. Recently, it announced that it would somewhat refocus one of its most well-known practices – acquiring talent – to acquiring companies with a minimum of people and a maximum of R&D, and even more recently it announced broad job cuts (like many other high-tech companies). Says Bostrom: “Culture is important to us, so we look for certain characteristics in the people of the companies we are buying. It’s not customers or geographical presence, but a technology or expertise we know we need. When you’re growing, you want to invest in human capital where it’s critical – engineers and sales.”

“For everything else, we want to use technology to scale. We’ll have fewer people [relatively], but use the Web and technology extensively. And if what you’re doing is not core, you can use partnerships. We own only eight of our 22 factories. We have one manufacturing employee for every seven or eight of our partners’ people. We use partnering for a seamless supply chain.”

She adds: “For many companies, the idea of partnering is frightening. They don’t know the basics. Some companies are good at it, some not. It’s in their genes.”

Yet she sees continual consolidation – into Cisco and elsewhere. “New small companies, once they get to a certain size, need a distribution channel. Take Ariba, for example. Can they continue to scale on their own? Will investors fund them to do so?”

Customers drive this trend, too, she points out. “They want linking and interoperability. They want a variety of benefits in a single horizontal slice. They don’t want the cost of integration, yet at the same time they want the best in each category.”

Ellen Hancock, Exodus - Only the fun parts

Exodus was started in 1994 by two young entrepreneurs as an ISP, recalls Ellen Hancock. But they soon found that their customers were more interested in servers than bandwidth.

“They built their first data center,” she continues, “and they were nervous because no one was talking about the concept.” However, the people who mattered – the cus-

tomers – had intense interest in it. “People like Hotmail would say, ‘I don’t want to build a data center. Take my servers, please!’”

Four years later the company had 300 customers, all dotcoms, and was ready to go public... except that it lacked a ceo. Kanwal Rekhi, founder of Excelan (sold to Novell) and an advisor to the company, got in touch with Hancock, who was then at Apple after 29 years at IBM and a year at National Semiconductor. She joined Exodus as ceo on March 10, and it went public on March 19, 1998.

“Once I saw what they did, it was very obviously a great idea,” she says. “I was on IBM’s outsourcing board; I had watched EDS grow up, Perot Systems, that whole market... But I never thought of a business that said we’re outsourcing only Website operations. And there’s so much else about this model that is more appealing than earlier models of outsourcing. At Exodus, we took only one employee from one customer. We just take the Website operations and the power management and the 3 am phone calls. It’s a nicer model; we’re not threatening to take over anyone’s staff. Cios *like* to talk to me!”

At that time Exodus’s revenues were 92 percent for servers and bandwidth, and 8 percent for value-added services such as monitoring. Its 300 customers included Hancock’s old employer, National Semi, as well as Sun and Hotmail.

“We were all about power and bandwidth,” says Hancock, “but you can’t just stay where you are, because over time, space and bandwidth become commodities. So we also did all the things people hated to do: 24/7 operations, call centers. We stay around over New Year’s; we worry about power supplies and backup generators.”

But at the same time, Exodus’s sheer size does matter, in very specific ways, Hancock points out. “Everyone talks about the ‘public Internet,’ but most of us [in the industry or in big companies] don’t use it. It’s private between ourselves. Of our traffic, 95 percent goes into private exchanges. Normal enterprises can’t get into that network because they can’t peer, but we pass that access on to our customers.”

Exodus now has about 4500 customers, 5.1 million square feet of space and 42 data centers worldwide. Almost 40 percent of revenues come from higher-level services.

Instead of working for one company where they are not core, Exodus’s operations employees are at the center of their universe. “If you talk to Exodus employees, there’s just an energy about the place,” says Hancock. “In most cases, people are

excited to work here. The people working in the data centers and response centers are the experts. At cocktail parties, people ask them what's happening on the Net. They know which computers customers pick. They know about traffic patterns, growth rates; they can watch the whole marketplace develop."

And of course they are intimately familiar with California's energy crisis. The company is pursuing a number of energy-efficiency and resource-development measures, including building a power substation on its Santa Clara campus, installing energy-efficient equipment in data centers, and developing self-supporting, on-site power generation facilities.

The company also has its own experts in data-center design and building architecture, and cutting-edge facilities people. It has partnerships with other industry leaders for a variety of leading-edge infrastructure technologies: Inktomi on caching systems; the Content Bridge Alliance on caching systems and network acceleration; Sun on server technology and storage; EMC on e-commerce; Cisco on network performance; and Entrust for digital certificates.

On the other hand, Exodus has to fight to stay focused itself. It has a little more than 4000 people, and Hancock worries about getting too big and unwieldy.

"About once a year or so," she says, "you hit a point where you say we've got to change again. We've gotten this far with the business we chose. We focused on adding enterprise customers to our customer base starting two years ago, and now they are more than half of our business. We're continuing to hire salespeople who can change their focus from dotcoms to the cio of Ford."

"We had that session last week. Because we're getting more and more enterprise-oriented, we need more people who understand legacy products such as CICS. In the fourth quarter, we brought on 245 new customers even though we lost some dotcoms. Originally, our enterprise customers wanted to do B2C, then B2B; now they want us to take over their internal systems. First we got Covisint [the auto industry exchange]; now we have 30 [of 60] of GE's divisions. As long as it's on the Web, we can run it. Still, we worry about getting too big unnecessarily. We want to grow customers and revenues, but not people."

So, Hancock turns to outsourcers for the functions that are not core to Exodus: "We outsource our marketing events, customer meetings, our sales event in the Bahamas. We outsource some of our recruiting, for executive searches. We outsource some

building design apart from the technical areas. And we outsource our cafeteria, which we share with another company in our office park.”

Ray Ozzie, Groove Networks – Connected but not tied

I first met Ray Ozzie back in the mists of time, around 1983, when he was a programmer working at Lotus on Symphony, an all-singing, all-dancing program integrating spreadsheet, wp and a data utility. He left Lotus late in 1984 to found Iris Associates and work on a secret project, which ended up becoming Lotus Notes. Ozzie made a point of keeping Iris independent of Lotus as long as he could. “Lotus was most creative when Mitch [Kapor] was still there. Perhaps because of his naiveté, he let people go off into corners to do things under the radar. Once he left, other people had enough power to squash those creative projects,” Ozzie says.

Iris ultimately got acquired by Lotus and is now owned by IBM, which has helped Notes to garner more than 68 million users.

Yet Notes had its flaws. For one, it created its own hermetically sealed environment – in those days before a workable Windows. Within that environment, it organized the management and communication of irregular data, mostly text, among knowledge workers working together within large global enterprises.

Although he has now learned how to promote himself and his company Groove Networks (SEE **RELEASE 1.0**, NOVEMBER 2000) and wants to go it alone without a Lotus or IBM, Ozzie is still most interested in the people using the tools – and puzzled by their behavior. He points to “the ugly side of what happens when companies grow” and waxes eloquent: “Left to their own devices, certain people tend to amass power in much the same way that countries used to amass land. But command and control tends to stifle the creativity out at the edges of the empire, leaving it with no outlet, no place to mutate, no place to grow. Instead, companies these days need to go in the opposite direction. They must shed the notion of vertical integration and adopt strategic or transformational outsourcing. They must continuously mutate, behave more like complex adaptive systems than closed, mechanical systems.

“At the edges, people choose communication tools that match the nature of their behavior. Their tools of choice today are email, the phone, and the fax. Why? Because they gravitate toward tools wholly within their direct control, tools that ‘just work’ when they need them. But the tools the industry has been building over the past few years follow a strictly centralized, server-based, highly-administered model: great for

controlled business processes, but sub-optimal for effective, direct, spontaneous, person-to-person work practices.”

He continues: “The question we asked ourselves at Groove was, what fundamental underpinnings do we have to build to bring the semantic level of the Net back up to the point where people can treat it as symmetrical, rather than have everything flow from a server representing corporate control?”

“People want to act locally, in small groups,” he continues. “They’re most effective locally. Yet they still want – and need – to be connected.”

Modern business, with its vast scale and complexity, depends more and more on the same ability Notes provided to organize complex data in defined, routine processes. Yet business life gets interesting precisely when it’s *irregular*, with the opportunity for large gains or losses. Discoveries are irregular; so are disasters.

Businesses gain a competitive advantage when they can handle things routinely – accurately and efficiently – while the competition still handles them as time-consuming, costly exceptions. Want a special meal? No problem. Lost your baggage? No problem; there are routines for handling that too, including apologies, reimbursements, special overnight kits.

In short, customers want to be treated as *individuals*, with individual needs: “I want *my* specific booking, unique to me.” But they do not want to be treated as *exceptions*: “Omigosh! this has never happened before! but we’ll do our best...”

Although Groove is positioned as a “peer-to-peer” tool, with all the attendant buzzwords, it is really a tool for handling exceptions. It works as a complement to traditional, routine applications. And when the problem is resolved, it keeps all the ad-hoc records together, so someone can come back to learn: How did we handle this last time? (Or perhaps, inevitably, who’s to blame?)

That’s why Ozzie created Groove. It represents the world as a place where human judgment and interaction are supreme, where you rely on people and their creativity rather than process and procedure. It acknowledges that unexpected things happen and that you need a way for people to communicate ad hoc to handle them.

Can Groove solve all the problems? It’s a start, but in practice, exceptional performance still depends on exceptional people.

Vivek Ranadivé, Tibco – If you're not realtime, you're history!

Vivek Ranadivé sees his infrastructure world as broad but very granular: “We’re moving to a model where everything will be dynamically priced. People will want business partners they can trust, but they’ll still be negotiating everything all the time. Realtime integration is key for this new model. We helped build the exchange system for EnronOnline, and since November 1999, it has traded more than \$300 billion in commodities. Energy, power, it will all be bid-ask.”

Of course, that viewpoint is not surprising, given Ranadivé’s heritage at Reuters, from which Tibco was spun out in 1997. (His first company, Teknekron, helped digitize Wall Street in the 1980s and was then acquired by Reuters.) Tibco distinguishes itself from other enterprise application integration vendors by its support for real-time interaction and its familiarity with the world of transactions. It seems the only thing people value more than their data is their money, and Tibco already knows how to take care of that.

In fact, money is not as fungible as you might think: It comes as a variety of objects with attached metadata – securities with expiration dates and jurisdictional constraints such as blue-sky laws (where a particular contract is valid), inflation rates, currencies, and the like. All that is similar to business data, which is both rich and also “meta”-ed: Which data can be exchanged freely; which falls under various privacy or confidentiality restrictions; which expires; which is linked to some other database? If two people “own” a piece of data, whose changes hold, and how are conflicting changes reconciled... in realtime? These are the kinds of granular issues Tibco deals with. Plus, it manages communication among enterprise and partner applications, setting up channels with the requisite security, priority and other features.

“We create these value webs, where we allow you to integrate your own business processes, extend your information assets, and connect to customers, partners and suppliers – B2everything!” says Ranadivé.

As systems become larger and more complex, they will also manage more information about their own components – everything from metadata about data and applications and communications protocols, to the identity of collaboration partners (cf. VeriSign). It’s one thing to personalize content in a portal (which Tibco also supports); it’s another to personalize the operations of a business-critical application and to allocate system resources precisely across a broad network according to who is asking for them. That requires systems easier to develop – Tibco’s original mission – and also easier to understand and modify.

Says Ranadivé, “There’s a need to represent all this in a way accessible not just to programmers but also to lawyers, auditors, privacy officers, regulators – and even consumers who may want to know what’s going on. There needs to be a clear way to translate in both directions between business rules and code. When we talk about integrating the value web, we are tying together not just applications but also business processes and workflows. Different pieces of crucial information can find their way through the supply chain without a human pushing the information through.” With the flair of a well-trained presenter, he announces alliteratively: “I like to say that we link *Communities*, managing *Content*, on which they can *Collaborate*, so that they can engage in *Commerce*.”

He goes on: “We know about the APIs, but we allow the business processes to collaborate more closely; we have process-flow engines that manage the interactions.” That all sounds simple to ask for, and at the same time complex to deliver. Indeed, says Ranadivé: “The infrastructure ‘operating system’ starts consuming everything over time, just as Windows consumes everything over time. With the PC, we started out with DOS, which managed the cpu and the memory on the disk. Now Windows manages everything – printers, Net access, communications, music players.... For us, it’s ERP, legacy databases, CRM, Web pages; our infrastructure OS brings all that together. We have hundreds of adapters for various applications or devices.”

If you’re lucky – or popular – Tibco will support you; otherwise, you have to build your own interfaces. For example, says Ranadivé, “If you want to sell to Intel, your software has to work on our infrastructure. Likewise, Cisco embeds our software into its products. You get the same dialtone wherever you are, when you’re using us and Cisco. If you ask for a realtime connection or a priority channel, the request goes through us to a Cisco router.”

Thank You!!!

We’d like to thank the following companies for contributing products and services to this year’s Forum:

PLURIMUS for personalized Website usage reports, **PROXIM** for our wireless local-area network; **SONY** for plasma displays and projectors; and **VOXEO** for the PC Forum Connect phone-based application.

And of course, we couldn’t have done it without our wonderful EDventure Holdings staff!

W E D N E S D A Y , M A R C H 28

P2P Roundtable in P2P Format (KW)

Depending on how you look at it, peer-to-peer (P2P) networking is either the new new thing or an old old thing finally getting its due. Most of the Internet's basic protocols and original applications use distributed connections between autonomous nodes. The Web's largely one-directional model of pulling content from central servers was in some sense a detour away from this approach (aided and abetted by corporations, governments and other control mongers).

The phenomenal growth of instant messaging and Napster reflects a powerful urge among users to operate not just as clients but as servers, and to connect to one another directly. Still, are we generalizing too much from the popularity of a service, now under US federal injunction, that makes it easy to download copyrighted music files for free? And even if we put aside the legal issues for a moment, does Napster have a coherent business model? Does any P2P company?

Some clearer definition is certainly called for here: The P2P label is applied to everything from totally decentralized file-sharing projects such as Gnutella and Freenet, to distributed computing services that manage activity centrally but farm out processing to the edge of the network. If P2P services thrive, who wins and perhaps more important, who loses? Where is the line between common infrastructure and proprietary applications in a distributed world? Will P2P still generate so much interest a year from now?... and what are the open issues that will determine the answer to that question?

Clay Shirky, Accelerator Group - The artist currently known as P2P evangelist

Clay Shirky is the unofficial interpreter for the P2P movement. Of course, the distributed mass of distributed computing companies and technologists doesn't speak with one voice, but Shirky has done the most to articulate just what's going on here and why it's important. For our roundtable he'll be both a client and a server, helping to moderate as well as offering his own views.

A partner with The Accelerator Group, which advises Internet startups, Shirky is currently on leave from his position as professor of new media at New York's Hunter College. Prior to those two positions, he was cto of SiteSpecific, an early Web development shop acquired by CKS. From the early days of the Web he has generated a

steady stream of essays for his own Website and outlets such as *Feed* and *Business 2.0*, exploring the implications of new technologies, communities and economic models. His creative roots go deep: Shirky received his Yale undergraduate degree in art and before getting involved in technology he was a director and lighting designer for avant-garde theater in New York City.

“I first became aware of peer-to-peer as a concept in a conversation in the back of a cab on the way to a party in 1998, when someone told me about Hotline,” Shirky explains, referring to an underground Napster-like file sharing and chat service. “My mind just blew up,” he recalls. He watched the growth of Napster from its early days in 1999 and started writing about the value of putting content at the edges of the network. Then he had a revelation.

“Sometime early in 2000 I realized Napster had turned traditional address space inside out,” says Shirky. “What’s compelling is that I can create a network identity for myself, for free, without asking either for help or permission.” Despite the rhetoric that the Internet automatically makes anyone a publisher, it’s actually quite hard to establish a persistent online identity from which you can serve content to others. You need to obtain a static IP address (which most ISPs are reluctant to assign to consumers), buy a domain name, configure arcane networking settings on your machine, get the ISP to configure its zone files to point to you, figure out how to install a Web server... and hope it all works.

Napster, and other P2P services such as instant messaging, eliminate the distinction between consumers and producers. Launch the software, make up a name for yourself and away you go! The link to addressing, Shirky says, is that the domain name system treats transiently connected users at the edge of the network as second-class citizens. If the servers in the middle of the network can’t find you reliably, they treat you as an appendage of something they can find, such as an ISP. Argues Shirky: “Because the current addressing schemes have no way of dealing with transient connectivity, you need to have something that doesn’t just tolerate unstable addresses – it expects them.”

From Shirky’s perspective, P2P isn’t about getting rid of servers or overthrowing intellectual property rights. It isn’t even about peers talking directly to peers, though he admits we’re stuck with the term: “We ended up settling on ‘P2P,’ but P2P came after the applications it was meant to describe – it’s a label not a description.”

Shirky articulated his definition most clearly in an essay published in November:

“P2P is a class of applications that takes advantage of resources – storage, cycles, content, human presence – available at the edges of the Internet. Because accessing these decentralized resources means operating in an environment of unstable connectivity and unpredictable IP addresses, P2P nodes must operate outside the DNS system and have significant or total autonomy from central servers.”

All well and good, but what about Napster and its battles with the record industry? “The music industry knows that Napster is the last time they will be able to get their hands around one neck,” he ventures. Whatever happens to Napster, P2P architectures will continue to thrive in other areas. “Were Napster to go away, it would be useful for P2P in that people would see that Napster is gone but many other P2P applications are still here,” he asserts. Even in the limited space of file sharing, he continues, “The number of things people want to share with one another is a very large superset of the number of illegal things they want to share.”

Shirky believes the most difficult question today is whether P2P (the industry) will become a victim of the success of P2P (the architecture): “Is this something that is so much a part of the infrastructure that it fades away and users don’t notice that it’s there?” To put it more concretely, “Is this like TCP/IP – such a fundamental change that no one can make money on it?”

Cory Doctorow, OpenCola – Renaissance geek

Growing up in Canada, Cory Doctorow was exposed to technology early on by his father, a programmer who worked for Visa and Shell Oil. He dropped out of college to work for Voyager, the pioneering CD-ROM developer. When Voyager hit hard times, Doctorow left and started working with advertising agencies to convince them to embrace technology. Initially that meant putting up Gopher sites on the pre-Web Internet, but it grew into a consulting and network-management business working on e-commerce solutions, online communities, security and technology integration for various marketing-oriented companies.

In his spare time, Doctorow writes science fiction stories, several published in mainstream sci-fi magazines. At last year’s annual Hugo Awards, the science fiction world’s Oscars, he won the John Campbell Award for best new author; his first book, **THE COMPETE IDIOT’S GUIDE TO WRITING SCIENCE FICTION**, was also published last year. His writing has paid off in other ways. Grad Conn, a former Procter & Gamble brand manager who was running a Toronto advertising agency, met Doctorow through an Internet forum Doctorow moderated. As it turned out, Conn was also an

avid science fiction fan and had read some of Doctorow's stories. The two hit it off. Today Conn is the ceo and Doctorow chief evangelist of OpenCola.

OpenCola is creating a set of distributed technologies to facilitate resource discovery over the Internet (SEE **RELEASE 1.0**, NOVEMBER 2000). It didn't start out as a P2P project. The original software was a server-side recommendation engine called My Little Robot that attempted to return relevant documents by correlating user requests with those of other users. Only problem: It didn't scale. John Henson, OpenCola's cto, came up with a novel idea. Why not distribute not only the process of fetching documents, but also the computational task of calculating relevance? In other words, what if every node could find similar nodes on its own, without reference to any canonical map in the center of the network?

It sounded crazy, Doctorow now admits. Then he saw a network map of Gnutella nodes. "It didn't look like any network topology I had seen," he says. "It wasn't a star... it was a hairball. I could put my hand in front of any part of the map and no path between any two remaining nodes was totally occluded. I saw in that a reliability and a robustness that was totally lacking in any other network model that I had seen." Doctorow was sold.

Today, Doctorow is an enthusiastic proponent of P2P approaches, which he believes have the potential to change the fundamental dynamics of networking. "Right now the networks are generally modeled around scarcity. I think P2P networks have the opportunity to reverse this," he says.

How so? "Network resources are non-bankable," he responds. In other words, the bandwidth a user fails to consume today can't be stored or "banked" until tomorrow. If you assume users are only consumers of that bandwidth, it becomes a scarce resource that must be allocated carefully (something the electric utilities in California have been struggling with of late). On the other hand, if every node on the network can share as well as consume, the model flips. Al can give Ethel the bandwidth he's not using today and in return get the bandwidth Ethel (or another user) doesn't need tomorrow. Generalize from bandwidth to other network-based services and you have a blueprint for P2P. In OpenCola's case the equation is even more compelling, because merely by consuming resources for their own benefit users generate information that benefits others.

Where's the business opportunity for companies like OpenCola in this distributed world? "The things that we are centralizing are things people don't want to manage

themselves anyway,” such as navigating firewalls and mining network traffic to understand what content users are interested in, says Doctorow. This information will be valuable to content creators, who will therefore have incentives to promote OpenCola’s technology to their customers, he argues.

Marc Hedlund, Popular Power – Computing power to the people

Marc Hedlund came to the P2P world by way of Lucasfilm, where he founded and ran the Internet division (SEE **RELEASE 1.0**, DECEMBER 2000). When he decided to leave Lucasfilm in 1999, he interviewed with about 20 technology companies. It was the heyday of B2C e-commerce, he recalls, and it seemed as though everyone was busy tackling surface-level problems such as building better online shopping carts. None of the opportunities excited him. As he points out, “I can attest that in 1994 as a political science major, I wrote [a shopping cart] in Perl and did very well selling it... because no real computer programmer found it an interesting problem.”

Distributed computing was different. Though it had been the subject of academic work for many years, it remained an unsolved challenge on many levels. “Getting distributed systems to work is not only difficult, it’s difficult to find a working one,” Hedlund says. Hedlund had been exposed to distributed rendering software at Lucasfilm and was intrigued by the SETI@Home project that was using distributed computational power across the Net to search for signs of extra-terrestrial life. These efforts, he felt, only scratched the surface of what would be possible by harnessing computational resources to solve difficult problems. Hedlund started talking with his old Reed College buddy Nelson Minar, who had also become involved with distributed computing. The two decided the best way to pursue their interests was to start a company in the space, so in January 2000 Popular Power was born.

Hedlund still sees P2P and distributed computing space as the place to be for technologists seeking a challenge. “It excites people because it’s hard,” he says. And beyond the technical excitement, Hedlund believes distributed systems will have a large impact on the structure of the technology industry. “If you think about things in this new way that is different from the way you thought about them over the last 10 years, then everything changes. And if you *don’t* think about them this way, then someone else will, or everything will change out from underneath you!” he argues. It’s the Internet all over again, he says: “If this really works, it changes the world.”

For some developers, Hedlund points out, the attraction of P2P is social and political as well as technical. The notion of eliminating central authorities, letting a thou-

sand flowers bloom through the spontaneous actions of enlightened individuals, appeals to those who fear the encroachment of government and corporate authorities. "It's easy to see a confluence of the Seattle World Trade Organization protests and programming in the P2P world," Hedlund says. "I think the people who got involved with this early were often motivated by more than the technology. Many of them had disruptive political agendas rather than disruptive technical agendas." The outlaw status of Napster and other P2P file-sharing projects has fed this mentality.

Despite the vaguely anarcho-syndicalist resonances of his company's name (he did after all go to Reed College...) Hedlund himself is more concerned with technology than with fomenting revolution. Popular Power is building software to tackle large-scale distributed computing tasks over the Internet, ranging from drug discovery to stock market analysis, transportation resource planning, oil field analysis and load testing of enterprise software. From a development standpoint, Hedlund sees the question of platforms as the most serious issue. All the members of our P2P panel, he points out, are currently developing on Java... and InfraSearch is now part of Sun!

But it's early in the game. Microsoft clearly has an interest in this space, having made a big bet on a more distributed, network-centric future with its .Net initiative. And there are plenty of other players eyeing the opportunity. "In the past there was this very clear choice," Hedlund says. "Windows was 90 percent of the market. Now there's this discontinuity, in my opinion a classic innovator's dilemma." Who wins and who loses as computing diffuses out over the Internet remains to be seen, Hedlund concludes.

Gene Kan, InfraSearch - Gone searchin'

When we last checked in on InfraSearch ceo Gene Kan (SEE **RELEASE 1.0**, NOVEMBER 2000), he and his company were experiencing the odd juxtaposition of being in deep stealth mode and appearing as the Next Big Thing on the cover of *Red Herring*. Kan and his co-founders were developing real-time distributed search technology to tackle the enduring challenge of information-discovery across the wild and woolly Internet. Based on an early prototype, they had raised seed financing from Angel Investors LLP and Net luminaries including Netscape alumni Marc Andreessen and Mike Homer as well as Excite co-founders Joe Kraus and Graham Spencer.

InfraSearch hasn't budged from beneath its self-imposed cover at Gonesilent.com. Kan, however, has remained in view as an unofficial spokesperson for the Gnutella

distributed file-sharing project, though he is no longer an active developer in the effort because of his InfraSearch responsibilities.

After graduating in 1997 with a degree in computer science from UC Berkeley, Kan worked at a succession of Bay Area companies including Documentum, Check Point Software, Narus and Wego. In his spare time, he got involved with open-source development projects such as the GIMP image-processing application. Then, in March 2000, Justin Frankel and Tom Pepper of Nullsoft, a streaming audio company that had been acquired by AOL, released Gnutella. Unlike Napster, Gnutella had no central directory of user addresses, making it impossible to shut down in the same way the record industry is seeking to disable Napster. AOL quickly branded Gnutella an "unauthorized freelance project" and took down the site distributing the software, but the horse had already left the barn.

Kan, who co-wrote the first Linux version, was part of the collaborative developer community that picked up Gnutella and reverse-engineered it. What attracted him to Gnutella, Kan says, was the technology's originality. "It was a really really weird system," he says. "It had no server. It was like the Internet on top of the Internet."

Exactly a year has passed since the launch of Gnutella, but in the hyperactive cauldron of P2P, it feels like much longer. Kan, despite his continued belief in P2P, has turned surprisingly pensive. Asked to identify major issues for its future, he jumps immediately to the impact of financing: "Is [the lack of] venture capital going to burn out P2P before it even starts? Capital was out there for consumer Internet services, B2C e-commerce and B2B. But the market has really fallen flat before what I would consider one of the most interesting developments on the Internet."

Surveying the landscape, Kan questions how many of the hundreds of P2P startups that have emerged are actually building something unique and valuable: "In my mind there are a few pure P2P success stories: instant messaging, Napster/Gnutella and not much else. A lot of people are looking at those success stories and saying, 'how can I build a build a P2P company into a success of that magnitude?' That's the wrong question to be asking. The right question is whether I can develop a valuable application... that might or might not incorporate P2P technology."

Juxtaposition

InfraSearch is still developing what it sees as a highly valuable application. But it's no longer doing so as an independent company. On March 6, Sun announced that it

was acquiring InfraSearch and would fold the company into its recently announced Project Juxtapose or JXTA.

The JXTA effort is being led by Sun chief scientist Bill Joy and managed by Mike Clary, who is also based at Sun's Aspen Smallworks division and previously worked with Joy on the Java and Jini initiatives. "A lot of people [in the P2P world] are having to go out and solve the entire stack problem," explains Clary. "What we're trying to do with JXTA is say, 'let's agree on low-level things that allow P2P to occur. In order to achieve a level of interoperability, let's agree on a common level of functionality. Let's institute some conventions that make sense'"

The three primary areas Sun has defined for JXTA are: making it possible to "pipe" processes together so that output from one peer can serve as input to another; grouping peers together across systems; and metering/monitoring functions. JXTA will employ an open-source model, based on the Apache license. Sun is talking with others in the P2P space to encourage them to collaborate on or support JXTA.

How does InfraSearch fit into this vision? "Our technology focus extends directly into JXTA's vision," says Kan. "I feel that it will take a lot of effort and analysis to develop a P2P system which is broadly horizontal and successful. Sun is committing to JXTA in a way that makes me confident it will be among the success stories."

Protocols and Policy

Craig Mundie, Microsoft

In 1992, Craig Mundie shut down Alliant, the supercomputing company he co-founded, and joined Microsoft to handle the IT equivalent of non-elephant zoology: non-PC digital devices for consumers. Seven years later, as most of the groups he created have slipped into Microsoft's mainstream, he has a new job working directly with Bill Gates on a new all-other job: non-immediate issues, which means coordinating architectural thinking across the company, thinking about critical infrastructure and representing the company in Washington (outside the courts).

"We need to do a lot of thinking about this question of critical infrastructure," he says. "How are computer systems going to have to change, in design and software? How can they be managed and audited, in order to defend themselves against all kinds of attacks. What are the deep implications of that?"

“I sponsored some research projects here, different ways to organize and manage computer systems. I’ve come to believe that this will be a 10-to-20-year problem, given that we’re already in year 11 for Windows NT and it is just reaching broad deployment. Whether it’s Microsoft or somebody else, you’re looking at a lot of work to be done. There’s rapid proliferation of devices and apps. So how do you get people to move from the past to the future? How much will be done because of significant failures that motivate people to make the change, or as a result of insurance/audit problems? I’m trying to get the company to lay the foundational work, to move the construction of those products.

“Bill and I always had this positive relationship. We’re both optimists,” continues Mundie. That makes him the ideal person to handle the issues of critical infrastructure and protection with constructive action rather than dismay... though many in the community would simply direct him right back to Microsoft to correct simple flaws such as the one in Outlook that has fostered so many viruses.

Of course, one man’s bug is another man’s feature. Outlook is a great productivity tool; the only problem is that sometimes it’s productive for virus-spreaders instead of for the individuals who should be using its powers.

That’s Mundie’s point. “We need to make our systems more policy-driven. The number of computers is overwhelming the number of people who can feed and care for them. When I told this to John Markoff [of *The New York Times*], he said, ‘It’s like when the telephone system went from operators to switches: You lost something, but you got scaling.’ Computing is getting to the point where the operators need to give way to something else. We have spread them out through the world assuming the presence of a professional IT organization around each one, but that’s no longer valid. There’s no cio for the home, no cio for the world.”

However, he notes, the telephone system is very narrow in engineering and in what it can do: “As you diffuse computers into virtually all of our business and personal lives, there’s much greater vulnerability. We have a lot more problems to solve than the phone system did.”

“Even if computers apply only to current problems, well before they reach sentience (if they do), society is becoming intimately dependent on them. Everything from your pacemaker to nuclear defense is run by a computer. Our susceptibility to failure is higher and our tolerance of it is lower. We can’t just batten down the hatches to keep danger outside, on a boat we’re all on. There’s some big discontinuity likely –

whether it will be a big disaster or a string of highly publicized small disasters. There are problems of chaos or cyberwarfare, where people have a nefarious intent. And then there are just breakdowns or thrashing, that may catch the water or power grid or what have you. There's a broad range of potential problems and causes. I don't think incremental engineering will get us there.

"There are two big changes we will have to make. The first relates to finding a way to reduce design flaws. Up to now, the industry has built ever-larger monolithic systems that have to be carefully constructed and administered. These are prone to subtle failures, even when we engineer and test them well. I believe we need new ways to specify, design, build, test, and operate our computer and software systems."

What are those? Objects? Peer-to-peer? AI? Mundie demurs.

"The second change relates to the problem that as system and operational complexity increases, we find that the bulk of the problems or susceptibilities actually come from errors made by people, as they operate or administer the systems. Today, *people* interpret the policy. They do this by converting business and operating assumptions for their computer systems into administrative settings and operational tasks. When they make a mistake, the systems either fail, or are vulnerable.

"Finding these mistakes is often very difficult," he concludes. But isn't the issue preventing them rather than finding them after the fact? "Yes," says Mundie, "but today we don't have any choice."

"I think that we have to involve the machines more directly in the implementation of policy. This will move the problems, but we at least have the opportunity to leverage the machines to have a chance at reducing the current class of problems as computers get diffused into everything and we increase our societal dependency on them."

But of course this leaves the issue of depending on the people who *build* the machines to define the policy.

PANEL: Governance as a Private Sector Function

It's not just small companies or even large companies who use outsourcing services (SEE EMPIRE PANEL, PAGE 36). Governments are doing much the same thing, turning to outsourcers so that they can focus on their core missions. Furthermore, with or without governments' participation, "outsourcers" of rulemaking/enforcement are taking on this role, filling a void in areas where governments cannot always help (cross-border e-commerce transactions) or should not interfere (control of the content on a Website).

Of course, it's not that simple: Sometimes governments like this trend, and sometimes they don't! (The case of ICANN, where the US government is voluntarily ceding control over the Internet's core infrastructure, is unusual and controversial.) Moreover, these outsourcers generally operate in collaboration with governments, handing tougher cases over to authorities who can use the force of law, the threat of incarceration or worse.

Nor is this all new: Publications have usually had editorial control, the financial markets have long had government-mandated private-sector regulation (as Steve Wallman points out), and communities have set their own rules. But with the proliferation of opportunities for strangers to interact with one another, often across traditional terrestrial jurisdictions, the opportunity and need for private-sector governance is growing.

These new "governance outsourcers" are taking on a variety of regulatory roles – providing services such as dispute resolution, identification and authentication, and market standards. Instead of a single, central authority, individuals can now look to a variety of private agencies for certification of trustworthiness, enforcement of contracts and the like. That doesn't mean that government is going away, but that like big business, it is no longer fully vertically integrated.

The good thing about this private-sector governance is that it is – generally – constrained by competition. Don't like EBay's rules or SquareTrade's dispute-resolution policies? Then you can go somewhere else. Don't like Plastic's editorial policies? Try another site. Don't like GeoTrust's ratings? Then find another rating service or join a marketplace with rules you like.

On the other hand, want to read Nazi propaganda? Then find a site outside of Europe. Or suppose you're a musician: You don't have to visit Napster yourself, but you may not like its rules for "sharing" your works.

In short, these agencies do collide, just like real-world governments, because communities are not fully walled off (fortunately!). A challenge for the private-sector regulators is to figure out how to define their jurisdiction – and their impact. Although most of them operate by contracts with their members (defining terms of service), they also need a way to solicit and handle input from non-member third parties who are affected by these contracts. Just as a government is responsible toward all its citizens, so is a private regulator accountable to all those affected by its rules. If the regulator does not recognize this, those third parties are likely to make themselves known.

Steve Abernethy, SquareTrade – Model of a modern mediator

“Boy meets girl” is a universal story line. So is “Item sold online disappoints buyer.” Yet each boy and each girl, and each item bought or sold, is unique and demands its own story. That fact creates a wealth of opportunities for novelists and dramatists, but a huge cost and goodwill drain for auction sites such as EBay.

The business side – but not the boy-meets-girl problem – also presented an opportunity for online dispute resolution that attracted Steve Abernethy, ceo of SquareTrade. Though originally trained as an architectural engineer at California Polytechnic, Abernethy spent three years after Harvard Business School at McKinsey doing e-commerce work – initially from a commercial, not a legal, perspective. But he noticed that “the legal side of e-commerce seemed to be a void.”

Working with some Harvard contacts, he met Ethan Katsh, a professor at UMass in Amherst who had conducted a two-week dispute-resolution pilot with EBay in early 1999, mediating buyer-seller disputes online using email and a single mediator (who is now a SquareTrade employee). With the analytical bent of an architect/engineer, he explains the business proposition he saw: “We arrived at online dispute resolution (vs. a slew of other legal concepts) because it had several nice attributes...beaten into us by a VC or two as we raised our seed round! There was immediate demand and a low-cost way to reach it: EBay does over 2 million transactions a week and hence had its reasonable share of disputes. Second, it was infrastructural: Markets need a neutral mechanism or buyers and sellers won’t feel comfortable trading.”

“Third, there was no learning curve or behavior change required; users were already online, comfortable with this environment and expected an online solution. And finally, it truly leveraged the Net: a 24/7, low-cost solution was required to reach around the world and address a 97-cent transaction as well as a multi-thousand-dollar transaction.”

That pilot turned into SquareTrade, a 45-person (five-lawyer) company based in San Francisco (SEE **RELEASE 1.0**, OCTOBER 2000). In the last year, SquareTrade has resolved more than 50,000 disputes for sales on EBay, ELance, DoveBid, HelloBrain, Onvia and some smaller marketplaces – 85 percent of them without the use of a human mediator. The company has funding from Chase Capital Partners, Weston Presidio and Draper Richards. It has also signed on some highly respected advisors: Harvard's Roger Fisher, author of the best-selling **GETTING TO YES**; David Johnson, who co-wrote "Law and Borders" for **RELEASE 1.0** back in June 1996; and Abernethy's original Harvard contact, Jonathan Zittrain of Harvard's Berkman Law Center.

What attracted them is not a typical firm of dispute mediators, but rather a software-based service unique to the Net – and to the volume and fundamental homogeneity of disputes generated by on-line consumer trading. Very simply, SquareTrade is an ASP that manages a standard dispute-resolution process, using techniques well-known to lawyers and mediators, and over time adding to its store of rule-of-thumb expertise based on summaries of actual EBay disputes (scrubbed of any identifying personal information).

Rather than encourage the parties to sit down and unburden themselves to a counselor, SquareTrade, only an optional click away from EBay's own screens, gets them to fill in an online form. So instead of a long story about waiting for the UPS man and how her boy was looking forward to the new chair and on and on, Alice is forced to focus on the relevant specifics of her complaint.

As you can see on SquareTrade's screens, those specifics are actually fairly standard:

I sent my payment but did not receive my merchandise.

The merchandise arrived late.

The merchandise was damaged when I received it.

The merchandise was different from the description.

The merchandise I received was incomplete (parts or items missing).

The seller posted negative feedback on me.

The seller threatened to post negative feedback on me.

There was bid shilling.

Problems that do not fit into the above categories.

Although there is a selection for "other," Alice is encouraged to get to the point. Her complaint is forwarded to the seller Juan, who can then tell his side of the story:

The merchandise I shipped was as described.
I sent the merchandise late.
I sent the merchandise on time.
I will ship the merchandise right away.
I am willing to contact the shipping company.
The merchandise was in mint condition when it was shipped.
The merchandise was in the condition that was described when it was shipped.
I will be shipping the rest of merchandise soon.
Merchandise was complete when shipped.

Two things are happening here behind the scenes: First, things are moving quickly, people are getting a chance to make their case, and no money is being spent. Second, the software generally reduces the emotional level and gets people to focus on the relevant facts – not on whether Alice likes the UPS man.

Beyond clear communications, the process also gives Juan and Alice a sense of what is reasonable. Is it reasonable to ask for three times your money back for a broken chair? Probably not. But it may be reasonable to ask for your money back, and to ask the shipping company to refund the charges if the item broke during shipment.

Accordingly, the software then suggests fair compensation options to both parties:

I am willing to give a partial refund and let the buyer keep the merchandise.
I am willing to give a full refund if the buyer returns the merchandise.
I am willing to replace the merchandise for one that is reflective of the description.
I am willing to repair the merchandise and send it back.
I am willing to replace the merchandise for another undamaged unit.
I am willing to pay for the buyer to repair the merchandise.
I am willing to send the missing part but for an extra fee.

The software then offers a secure chat room for the parties to negotiate a settlement.

About 85 percent of the disputes are resolved by this automated process, with no mediator – and no fee to either party on EBay as well as other sponsoring market-places. The rest of the disputes are escalated to one of about 250 mediators who work under contract to SquareTrade. Of those, most are resolved successfully. The rest, about 5 percent of the total, are closed without a resolution (leaving parties to more traditional means of recourse such as small claims court, or escalation to fraud charges). Within EBay, the price for a human mediator is a flat \$15 fee (since EBay

supplements the cost of the service). Outside EBay, the price of a SquareTrade mediator starts at \$40 plus 1 percent of transaction over \$1000 (generally split between buyer and seller). The mediator is paid per case, starting at \$30, based on the nature and size of the dispute.

The company has a very effective marketing tool: SquareTrade's own customers virally spreading its record of success. "The key is how good we actually are," says Abernethy. "The message boards and feedback within EBay are powerful. The message boards are an enforcement mechanism for user behavior, and also for us."

In late December, SquareTrade extended the service to offer a merchant seal program, whereby sellers commit to use the process and post a seal, sort of a guarantee of fairness and due process. The idea is that these sellers, called SealMembers, are less likely to be in disputes, and when disputes do arise, SealMembers are pledged to use SquareTrade. In addition, SquareTrade makes a \$250 fraud guarantee to those buying from sealholders. So far, SquareTrade has signed up 2000 SealMembers.

In essence, SquareTrade is automating the process of resolving standard disputes, and it is building up a body of "case law." For now, the range of disputes is fairly limited. But the service will get richer over time, as its body of cases grows. SquareTrade retains data to correlate such items as origination and type of dispute and form of resolution, while separating it from disputants' identity to avoid violation of confidentiality and privacy constraints. SquareTrade also keeps a database of SealMembers who have been canceled due to violation of standards, as well as a list of non-responding buyers to complaints by sellers; this could someday be as valuable as a credit database.

Dave Chen, GeoTrust - Scalable trust

What is it with McKinsey? Like Sue Bostrom, Nirav Tolia and Steve Abernethy, Dave Chen, now ceo of GeoTrust, started out at McKinsey. But he was working on decision science in defense electronics, not e-commerce. His task was to evaluate C3 (command, control and communications) for Sperry Defense Electronics; as part of that work he spent time with a government agency he cannot name.

Watching the decision-making there, and perhaps experiencing some premonitory nostalgia for e-commerce, he noticed: "The better the network, the poorer the decision-making process. People on the ground who knew the situation well, would buck the decision up the command to someone senior who lacked the intimacy, the

nitty-gritty knowledge to make the right decisions.” In other words, you can transmit the decisions or move the authority around easily, but it’s a lot harder to pass along the details that underlie a good decision.

He recalls: “The big surprise for me was learning how much thought and investment the military put into the ‘communications’ network and into understanding the communicating/decision-making process. Yes, the military bought tanks, warplanes, ships, missiles...but underlying these was a very sophisticated understanding of the challenges in managing both a ‘command & control’ (realtime) network and an ‘intelligence’ (non-realtime, synthesis, analysis, forecasting) network, all geared towards a very real-world application.”

“I got a glimpse into this in 1985: It’s not about the network and connectivity; it’s about the processes and policies that enable several million military personnel – generals, bureaucrats and foot soldiers – to work productively and respond in the appropriate timeframes. I see many of these realizations just now coming out in understanding about the Net.”

As Chen continues in consultese, “the better communication and the more information you *think* you have, the more important it is to push decentralization of decision-making. Back when we first got the Net, we thought, ‘Great! All this information, immediate access!’ And now everyone is crying out for editors and filters” (CF. STEVEN JOHNSON, PAGE 29).

Fifteen years later, in 1999, he formed GeoTrust (SEE **RELEASE 1.0**, OCTOBER 2000) to apply some of these insights to business decision-making, especially about trustworthiness: Whom can you trust? Under what circumstances? “We started with a vision,” he recalls. “When you open up your wallet, you see dollar bills and driver’s licenses, and you know that the US government is standing behind them. How can you create something like that for online trading? What credentials and authorities can vouch for your identity online? What parts of ‘trust’ can you scale and automate? There’s a lot you can scale: authentication, rights management, information about behavior. But as we got closer to implementation, reality set in. You can’t scale relationships.”

Moreover, Chen found that the real challenge was creating trust where there were no relationships. Accordingly, its business now, rather than the original idea of seals of approval, is the *information* that engenders trust – everything from authentication of identity to persistent profiles. Some of the information is confidential, but it underlies less-specific information such as credit ratings.

The company now operates as an information funnel providing two primary services: a “universal” registration and authentication service, and a business credential. The company uses a variety of third-party services in this offering, including Equifax, Experian, HNC, SGS, InfoUSA, Ernst & Young, and others. Harking back to Chen’s earlier work, the idea is to provide enough information locally so that individual market players can make their own decisions, rather than the “exchange” model where you are either a member of the club or outside it. With GeoTrust’s certificates, companies can decide whether or not to deal with a party for themselves.

GeoTrust manages the information and its disclosure according to how much its clients are willing to disclose to whom. GeoTrust lets the client control the use of the information, but it guarantees that what is revealed in aggregate accurately reflects the confidential details. In other words, its clients may not disclose all, but they do not lie or mislead. GeoTrust acts as a third-party sanitizer.

GeoTrust’s business is still small, but growing. Its value is greatest, he notes, across borders. Chen points with special pride to a recent deal with the US-Mexico Chamber of Commerce for the “Wiring the Border” program, which is a practical approach to implementing the promises of NAFTA (the North America Free Trade Agreement) for smaller companies. GeoTrust will provide identity and credential services to a virtual network of 400 small-to-medium-sized businesses in 10 states on both sides of the US-Mexico border.

Other partners on the Wiring the Border project – the lucky guys who don’t need credentials because they already have reputations – include IBM, Telmex, CompUSA/Prodigy, Roadway, GE, and Onvia/Globe-1.

Steve Wallman, Folio^{fn} – How the government helps

Steve Wallman had a long career as a securities lawyer at Covington & Burling in Washington before joining the US Securities and Exchange Commission as a commissioner from 1994 to 1997. He founded Folio^{fn} in 1998, around the concept of a “folio” – a customizable portfolio of stocks that offer the diversification and cost advantages of mutual fund investing but the tax, customization and other benefits of direct stock ownership.

At Folio^{fn}, Wallman says, he is now benefiting from the environment of trust he (and colleagues) fostered at the SEC. In a world where people can rely on the government to help protect them, Wallman points out, they are more willing to trust newcomers.

“Trust is a very hard thing to acquire. Regulation allows you to assume the mantle of trust more quickly. We may still not get the reputation of Merrill Lynch, not for a couple of years at least... but people send us their funds without fearing that we’ll take the money and run. Generally, no surrogate can do what the government does.”

“Without government regulation, we still could have built our service, but it would have been harder for anyone to trust us. They might trust a bigger partner, but we had an idea that would disrupt everyone’s business. When we went to those big guys, they said, ‘That looks like a good idea...for someone else. Go away!’ If we had not had the ability to leverage off 75 years of [US] regulation and the Internet, we would not be here.”

He continues with a litany of belts and suspenders, both public and private: “We still have areas at Folio^{fn} where customers might have had concerns. On privacy, we subscribe to TRUSTe, but there’s also government regulation to protect customers’ privacy [in financial services, at least!]. And of course there’s how their securities and cash are protected. We have two different layers of direct government regulation: the SEC, and each state’s regulatory oversight, as well as two layers of government-mandated private-sector regulation: the NASD [National Association of Securities Dealers] and SIPC [Securities Investor Protection Corporation] insurance. And then we add an additional voluntary level – we voluntarily increase (and pay for) excess SIPC insurance for each account. And we promise other things: how our system works to provide better-than-best execution, etc., with all kinds of disclosures on the site. You can differentiate yourself with the voluntary mechanisms, but eventually you end up with self-regulation or even government intervention. Without effective enforcement mechanisms, you can’t do much.”

Yet, right now, his competitors are trying to get Folio^{fn} regulated as a mutual fund (it is currently regulated as a fully self-clearing broker-dealer) to reduce its competitive impact – an instance of what then-FCC chairman Bill Kennard called “regulatory capitalism” at last year’s PC Forum. Wallman says, “The trade association for the mutual fund industry [the Investment Company Institute] argues that since we can compete with them with a better offering we should be regulated like them, even though our system poses none of the potential risks of a traditional mutual fund.”

In that case, why not focus more on investor education and disclosure than on a system that can be twisted by “regulatees” to protect themselves from competitors?

Wallman's response is measured: "It depends. For smaller investors, we need substantive regulations rather than just disclosure, where the cost for individuals to ferret out information and be comfortable relying on it is too great. Indeed, in the US, we used to have so-called 'merit regulation' for IPOs. In certain states, you had not just to comply with disclosure requirements, but you actually had to meet some criteria...or some regulator could just decide you didn't make the cut. For example, back in the 80s, I believe the Massachusetts regulator just thought Apple was too risky a stock for its IPO to be sold in Massachusetts. In the past, we thought you needed substantive regulation, but now disclosure is usually deemed sufficient. Whereas with privacy, it's going the other way...."

In financial markets, he adds, "We were leading the regulation of a world market [at the SEC]. It's not that we were ferreting out fraud in Djakarta, but governments were looking to us for guidance in making their rules. The rest of the world pretty much was willing to listen to what we were doing. Many Israeli companies come here to go public, and lots of people come here to invest. People feel that they are safe here in the US; it's a world-class jurisdiction."

In other sectors, too, Wallman sees room for private-sector initiatives. "It's different for, say, EBay. There's less regulatory infrastructure out there already, so there's more need, or opportunity, for EBay to do it themselves. EBay has done that pretty effectively. It's not hard to come back under a different identity or email address when they kick you off. But there's generally less at stake, so it doesn't matter as much."

We'd argue that kicking someone off the site is a pretty good mechanism for regulation on the Net, as long as you have some good way of establishing a player's identity. And *on* the Net but outside the US, people may trust their governments less than they trust, say, Citibank. Wallman concurs, and adds, "That is probably one reason it is so much harder for entrepreneurs to create new ventures in many other countries. It could also be why, especially in financial services, other countries' industry is far more concentrated, with only a few major players, as compared to the US."

More Than Just a Pretty Website

Jeff Bezos, Amazon.com

In 1994, Jeff Bezos, formerly with Bankers Trust, was on the management team at D.E. Shaw & Co., the Wall Street firm founded by former supercomputer pioneer David Shaw. Bezos, who had been reading about the Internet and its growth at work, went in the other direction from Shaw.

“We were a UNIX shop,” he recalls. “The Mosaic browser had captured people’s attention. It was the subject of hallway conversations: The Web had added images and was growing explosively.”

Being a fairly quantitative business guy, Bezos studied the market: What would make sense to sell over the Internet? Without the cost of printing and mailing catalogues, you could offer six or ten times as many book titles as even large superstores and hundreds of times as many titles as a catalogue. In the bigger mail-order categories, like clothing, he says, it wasn’t as clear how you could dramatically improve selection or some other aspect of customer experience.

He took Shaw for a two-hour walk in Central Park. “David said it would be a good idea, but a better idea for someone who didn’t already have a good job. He told me to think about it for 48 hours. So I used a regret-minimization framework; this isn’t a new idea [or patented], but it’s useful: Look back from age 80. I knew that if I tried it and failed, I wouldn’t regret it. And if I didn’t try, I would always regret it. So I did it.”

Amazon launched a year later, in July 1995, with its location carefully selected to be near Ingram’s warehouse near Seattle... and a large technical work force. The fundamental premise was something online that couldn’t exist in any other way.

“It has evolved a lot, but it is more stable than most people would guess,” says Bezos. “The big surprise was the plan, not the model. The original plan was books only, and slow. We knew we might add other categories, but that was not in the plan. The big surprise was the speed. We changed the numbers radically in the first 30 days. We were going to ramp up slowly and fund our growth internally, but that all changed when we saw explosive customer adoption in the first 30 days.”

But much of what makes Amazon special was not in its germ plasm from the start. Notification services and personalization, both fitting the only-on-the-Net criterion, were in the original plan, but many other features, including various “community

services” such as customer reviews and purchase rankings, were not. Many of these services are some form of collective action: the service’s data about itself is of interest to the community. And of course, notes Bezos, one-click shopping was another innovation that Amazon came up with along the way.

So let’s consider one-click shopping and business-process patents. Bezos has a well thought-out point of view. Though he doesn’t agree with the precise parameters of the current patent system, he’s happy with the notion that patents are an artificial, pragmatic construct designed to foster and reward innovation. And therefore Amazon uses them as effectively as it can. For Bezos it’s not a moral issue but a practical one, and the big question is: What time period makes sense? (Or perhaps there is a moral argument – that an inventor should get some reward for his or her work.)

Says Bezos: “I think business-process patents are a fundamentally good idea, but they last too long. If an invention is non-obvious and can be easily copied, it needs some protection, for some period of time. You don’t want the copiers always to win; sometimes you want the pioneers to win. Seventeen or 20 years is too long for most software or business patents. They don’t take the time or infrastructure, either to exploit or to copy. It’s different, with, say, drugs, which take years of testing before you can even start.” Three to five years strikes him as reasonable – a period that will work best in a fast-moving marketplace. Call it a software VC’s time horizon....

Or, it’s roughly Amazon’s lifespan since its IPO in 1997. “For five years,” says Bezos, “we’ve declined to predict when we would be profitable. We just didn’t have the visibility. Other people claimed they did have the visibility.... Some of them I thought made unreasonable claims, and indeed they have been proven to be unreasonable! We now say that by the end of 2001, we’ll have pro forma operating profitability.”

The point is that costs are controllable, but of course market conditions – both on the customer and investor side – are not. By previously refusing to make promises about profitability, the company retained the ability to adjust.

Indeed, market attitudes have changed. By the end of 1998, operating losses were down to 7 percent, but funding was easy. The company released the throttles in 1999, expanded into other countries and new products, ending the year with operating losses at 26 percent.

And for 2000, which ended on a much more cautious note, the operating loss will be down to about 6 percent, and 2 percent in the US alone. “In the fourth [calendar]

quarter,” says Bezos, “we’re predicting US operating profit will subsidize the rest of the world. Even if there were a third dimension we could expand into, we wouldn’t this year, given the capital markets.”

Bezos is confident even as spreaders of *schadenfreude* point to the debt on its balance sheet. Notes Bezos, “This is 10-year convertible debt: The principal doesn’t begin to get repaid until 2009, and then only if it hasn’t converted into equity.”

“This is a fixed-cost business, so scale is a big advantage,” says Bezos. “We have five times the traffic of our closest online competitor and eight times the sales of that competitor. Most of our costs are not variable; we can amortize what we spend over a growing customer base. We trade technology for real estate, and we come out ahead. Thanks to Moore’s law, tech costs are going down, while the cost of real estate is rising slightly faster than inflation. Our main competitors are offline. We’re competing with physical stores, because that’s where the sales are. We don’t want to take share away from other online stores; we want to grow that whole market.”

The real difference in vision is that the detractors see Amazon as a victim of market forces, just one more company buffeted by financial markets. But Bezos feels firmly in control. With his financial background, he sees Amazon as a finely tuned machine that he can navigate through the shoals. The alarms and disputes are just noise.

Take one last dispute: last summer’s brouhaha over whether Amazon was charging its best customers more. Here Bezos *does* think it’s a moral issue – and he gets quite heated. “We did not do what people said we did!” There’s a big difference between charging your best customers more, and rewarding them. In the end, we’d argue, the issue is disclosure. If you charge your best customers more for what is essentially the same offer, they are unlikely to stay your best customers for long. But customers will accept an offer that is fairly disclosed, says Bezos: “They don’t mind the Saturday-night stayovers from the airlines. They’re annoying, but people know what they’re getting, and what they’re giving up.”

Or perhaps the difference is between setting the terms according to behavior vs. according to someone’s identity. People want to know that if they meet the terms, they can get the same offer. It’s back to disclosure and fair rules.

That means Amazon may indeed try dynamic pricing – but only in a way that gets customer buy-in, and that maximizes satisfaction on both sides. As Bezos says, the company is evolving. His drive is to search out new ideas that will keep the company ahead – not just of competitors, but of its own previous self.

THE GALLERY: People, Places and Things

Seeing is believing. You can read all the articles or press releases you want, but to appreciate some technologies there's no substitute for your own two eyes. At this year's PC Forum, the Gallery showcases new companies defining the online world visually.

Humans have been creating representations of themselves for millennia, and we've been drawing maps and other visual aids to make sense of our world since the dawn of history. We love to play God by making art and technology in our own image. Now that we've invented a new territory of virtual space online, the same urge to map topography and demography is re-appearing. Yahoo! tells you what's on the Web, but it's hard to get a feel for the landscape from endless screens of lists. Email, chat and instant messaging let people talk to one another, but the absence of a human face on the other end can rob the conversations of emotional depth... admittedly, not always a bad thing! We want to wander around and feel the merchandise we buy online. And we want to know who else is out there in cyberspace: Where are they going and what are they doing?

There will be seven demonstrators in the Gallery. They will describe and show off their products throughout Monday and Tuesday afternoon.

ANTARCTI.CA creates visual landscapes of the Web. The company was founded by Tim Bray, co-creator of XML. As it notes on its Website, "Presenting networks in familiar terms – such as landscapes and maps – makes complex arrangements of data usable by the human mind, as this is the environment in which we spend our daily lives."

LIFEFX makes extremely realistic digital faces that can speak, interact and show emotions. Its core technology was originally developed at the University of Auckland for medical applications such as training eye surgeons. By making possible highly life-like virtual faces (and ultimately virtual people), the company hopes to make online interactions richer and more natural.

PLURIMUS gathers information on usage patterns across the Web, generating reports that for the first time show actual traffic patterns of millions of users across multiple Websites. Rather than track a pre-selected panel, Plurimus aggregates anonymous data from ISPs (with careful attention to privacy!). In addition to demonstrating in the Gallery, Plurimus has created personalized reports for PC Forum attendees that it will make available at the conference.

REAL USER has developed a new kind of authentication service that relies on the innate capability of the human brain to pick out a unique set of memorized faces from a group. Real User's Passfaces technology avoids the dreaded problem of the password on the Post-it pad. (Disclosure: Esther Dyson is an investor.)

SCENE7 offers a suite of tools and proprietary rendering technologies to create highly realistic, interactive images. These allow online merchants and others to offer 3D visualization, real-time image customization, mix-and-match comparison viewing and schematic arrangement of items in space.

SEESTORM makes real-time communication over the Internet more real, by capturing movements, facial expressions and gestures which it incorporates into digital avatars. The technology creates an experience similar to videoconferencing but runs over low-speed dial-up modems; it also offers privacy and personal control over appearance videoconferencing cannot. (Disclosure: Esther Dyson is an investor.)

SELF-REPRODUCING ROBOTS are the work of the Golem (Genetically Organized Lifelike Electro Mechanics) project led by Professor Jordan Pollack and Hod Lipson of Brandeis University. The robots evolve their own structures through computerized simulations and then are fabricated with rapid prototyping equipment.

Usability Clinic

Most Websites today do a poor job of defining themselves in terms of the needs and predilections of their users. Though they should be the most personal, interactive and intuitive means of engaging in commerce and obtaining information, most commercial and organizational Websites offer a disappointing customer or user experience. Usability seems like an obvious concept, but seeing actual users struggle through the experience of navigating a site often reveals flaws the site's creators completely ignored (SEE **RELEASE 1.0**, JANUARY 2001).

Jakob Nielsen and colleagues from the Nielsen Norman Group, a user experience strategy consulting firm, will host a live usability test at PC Forum on Monday afternoon. Learn how to test your own site and observe some of the general usability principles that emerge from specific cases. Nielsen, among the first to examine Web usability while at Sun, is a well-known commentator and author who founded the group with human-centered design expert Don Norman.

COMPANY PRESENTERS

We are pleased to introduce 12 company presenters who will use PC Forum as an opportunity to define themselves. Nine of them are debutantes, launching their companies or revealing significant details for the first time at the conference: ActiveBuddy, BlueArc, KnowNow, Lumeta, OpenDesign, PowerMarket, Seven, Verb and Voxeo.

As you might expect, we have no B2C e-tailers or advertising-supported Websites, while enterprise software and infrastructure are well-represented. All of the presenters are focusing their energy on business opportunities that generate real revenue in the near term. But these are not simply incremental advances or niche plays. All of the companies have powerful technologies and visions, and all promise to shake up industries or make possible innovative new services.

The presenters represent some of the most fertile sectors in the market today, including wireless data, P2P, search and navigation, Linux and instant messaging. Rather than define them by market segment, we've grouped them loosely into three categories:

Defining intelligence

In a world filled with virtual trees, how can we envision the forest and use that viewpoint to find the paths that take us where we want to go?

LUMETA gives enterprises maps of their intranets and analyzes firewall configurations with automated tools.

POWERMARKET aggregates internal and external supply-chain and procurement information to allow businesses to optimize their decision-making.

PURPLEYOGI automatically classifies documents and matches them against dynamic user profiles.

VERB develops intuitive navigation interfaces that work across different devices.

Defining information flow

Data and other resources must be delivered where they are needed in a rapid, efficient manner. Above the transport layer, what kinds of domain-specific or other tools can make that possible?

BLUEARC has created a network file server that may dramatically outperform existing solutions.

CHANNELWAVE manages partner relationships and facilitates complex self-assembling marketplaces.

OPENDESIGN allows applications to scale automatically across distributed networks.

SEVEN addresses the critical bottlenecks to enterprise wireless data services.

Defining interactivity

In a connected world, information can always flow in both directions. What does that change and what kinds of platforms are most appropriate to support robust interactivity at Internet scale?

ACTIVEBUDDY builds automated software agents on top of instant messaging networks.

EAZEL has developed a powerful yet easy-to-use desktop user environment for Linux.

KNOWNOW is creating fundamental technology for the “two-way Web.”

VOXEO has a platform that makes it easy to create, deploy and manage phone-based applications.

*Descriptions of all the presenters, in alphabetical order, are below.
(D) denotes debutante.*

ActiveBuddy (D)

ActiveBuddy wants to turn instant messaging (IM) into instant everything. IM is one of the most popular services on the Internet, with AOL Instant Messenger and ICQ each claiming more than 60 million registered users and millions more using similar offerings from Microsoft, Yahoo! and others (SEE **RELEASE 1.0**, JUNE 1997).

ActiveBuddy adds automated agents that respond to queries. As far as your IM client is concerned, they look like any other buddy on your list... only instead of talking to people, you can talk to software agents that interface to back-end databases and applications. Early examples include retrieving bits of information such as stock quotes and weather forecasts as well as knock-knock jokes, but the technology supports virtually anything that can generate text or simple graphical output. "It's agent technology mated with IM," says ActiveBuddy ceo Peter Levitan. "This super-fast, super-easy-to-use conversation interface now becomes a way to access information and applications at a very high speed."

ActiveBuddy grew out of – what else? – an IM conversation between Tim Kay and Robert Hoffer, who had co-founded Query Labs, a provider of Internet-based directory services to media companies. They created a prototype and showed it to Levitan, who was running local portal New Jersey Online. Levitan was excited about the idea and came aboard as ceo.

Ironically, Internet Relay Chat (IRC), one of the antecedents of Internet-based IM, had earlier developed a rich environment of bots, or automated agents that engaged in conversations, retrieved information or performed other functions. Yet nothing like this has been deployed commercially on IM networks. Building a natural-language query interface as well as the back-end integration and translation technology to give useful responses in the constrained environment of IM is a challenge, Levitan says. ActiveBuddy's agents automatically learn users' profiles over time, so that, for example, if you indicate where you live, the agent knows to give you weather in that city as a default when you request a forecast.

You can get the same information ActiveBuddy delivers by going to a Website or Web-based search engine, but there's something powerful about getting an instant response without having to wait for a Web page to load. "You ask a question and you get an answer immediately," says Levitan. "When I was in the Website business I wanted people to spend as much time as possible on my site. We're almost trying to get people to spend the *shortest* possible time interacting with the system." Speed

ACTIVEBUDDY INFO
Headquarters: New York, NY
Founded: March 2000
Employees: 45
Funding: \$10.6 million from Wit SoundView and Reuters
URL: www.activebuddy.com

means instant gratification and also creates opportunities for business services in sectors such as financial services where time is money.

Levitan sees a significant opportunity on the consumer side by creating branded buddies that companies can promote. "You have this virgin space called instant messaging or buddy lists. The availability to stick my brand in that space is of high value to marketers." Your buddy list is very personal space, though, so as Levitan acknowledges the marketers have to give consumers some reason to invite them in. As an example, he imagines a Tiger Woods golf buddy that provides information and tells users when Nike's new golfballs are available in your town. The company will generate revenue selling tools, hosting and tracking services to allow such companies to create their own buddies.

Today IM networks are not interoperable, and AOL has resisted efforts by other services to integrate with its market-leading services. ActiveBuddy is talking with the major networks about partnerships and its technology formats information to work over all of them. Because an agent simply shows up on an IM network as another buddy rather than potentially drawing away traffic and users, ActiveBuddy has so far not run into any trouble with AOL. The company is talking to other providers of IM-like messaging services, including phone companies, paging and wireless email device manufacturers and wireless carriers. "One advantage of the technology is that 'you' on the PC is the same as 'you' on the phone. The profile actually moves across devices," he points out.

BlueArc (D)

You can never be too rich, too thin or have too much storage capacity. BlueArc plans to shake up the market for the file servers that manage networked storage with a simple value proposition, says founder and cto Geoff Barrall: "Everybody's got a file server. How would you like your file server to be 10 times faster?"

Storage, once a boring backwater of the computer hardware industry, has suddenly become hot in recent years as it became clear that the burgeoning growth of the Internet and corporate networks would require massive amounts of disk space and servers capable of pulling data from those disks at high speeds. As more and more information goes online, and especially as that information includes more images and rich media, storage demands will continue to increase. EMC and Network Appliance, the two leaders in the networked storage space, have enjoyed huge stock

run-ups as a result, while other major IT players such as Compaq and HP have devoted significant resources to the storage market.

As one might expect, storage server capacity has been increasing. Just as PC hard disks now come standard in tens of gigabytes, networked storage systems are routinely measured in terabytes, with petabytes and other exotic prefixes entering the vocabulary. Big disks aren't enough, though, if you can't access them quickly. As networks get faster, storage servers become a bottleneck. The core problem, says Barrall with perhaps a bit of hyperbole, is that "server technology really hasn't gone through a revolution in something like 50 years." He continues: "It's an architecture that was designed many many years ago for computation, not for throughput."

BlueArc set out to rethink the server for the storage demands of today's Internet. As a result, says ceo Enrico Pesatori, "this is the only storage server designed from the ground up to work with gigabit networks." Pesatori joined BlueArc from Compaq, where he was svp responsible for the enterprise business after serving as president of Tandem, which Compaq acquired in 1997.

"Effectively what we've done is designed a server like a switch or a router," explains Barrall. In creating its SiliconServer, BlueArc took most of the bottleneck-producing functions that existing servers perform in software, and implemented them in hardware for faster throughput. This is a familiar trick in the technology world, used by everything from PC video graphics cards manufacturers to router vendors. To avoid the traditional downside of hardware – inflexibility – BlueArc used field-programmable gate arrays that can be reprogrammed on the fly. It also uses a pipeline architecture to handle key functions in parallel, further enhancing performance.

The result is a box that, according to Pesatori, beats competing products in every major dimension – speed, capacity, maximum number of users and price. It works effectively in both the network-attached storage (NAS) configuration Network Appliance dominates as well as the storage-area networks (SAN) where EMC is strongest. Pesatori has the pitch down: "We give customers the ease of use and low cost of ownership of NAS products with the performance and scalability that is typical of SAN." If that's not enough to get you all tingly with excitement, Pesatori offers up a more business-oriented pitch for BlueArc's technology: "How could you scale your productivity if you could scale your file server performance ten times?"

BLUEARC INFO
Headquarters: Mountain View, CA
Founded: February 1998
Employees: 130
Funding: \$37 million from Celtic House, Apax Partners and Patricof & Co.
URL: www.bluearc.com

ChannelWave

Forty percent of the world's commerce flows through channels. Only one problem, says ChannelWave ceo Chris Heidelberger: "There's a huge pain around selling and marketing through channels and alliances." Companies can't find the best partners, information doesn't get to where it needs to go, partners don't collaborate effectively and partners' salesforces don't push your product. In addressing these problems ChannelWave also believes it can help partner networks evolve from simple linear channels to dynamic multi-dimensional marketplaces.

"For years people have had partner relationship management (PRM) strategies," says Heidelberger, whose previous company, Sensormatic, sold security systems exclusively through channel partners. Yet the various aspects of the partner lifecycle, such as recruiting partners, training and certifying them, managing the flow of leads and co-marketing have all been treated as separate problems addressed by special-purpose software. ChannelWave brings together the entire process around a partner knowledgebase, so that partners get access to the right materials and resources at every point. It integrates this with a robust back-end featuring security, role management and accounting.

One benefit is cost savings, notes Heidelberger, but more important is the revenue boost that comes from building loyalty and tighter relationships among partners. Since its founding in 1997, ChannelWave has built up an impressive roster of technology-focused customers including IBM, BEA, AT&T, HP, 3Com, Nortel, Informix, GM and Qwest. Pricing depends on the number of partners and modules involved, ranging from \$180,000 for a base system to more than \$1 million for a full package.

If that were all ChannelWave had to offer it would be a nice enterprise software story, but not much to get excited about. What makes the company intriguing is the way it goes beyond the usual models for partner relationships. "PRM traditionally

dealt with vendors and partners and all the things that happen between. We've extended it to include the end-customer," explains vp of marketing Drew Williams. For example, partners can collaborate using online guided-selling tools that help end-users find the best reseller or distributor to complete the sale. In other words, instead of just routing leads once they enter the system, ChannelWave helps partner networks create them.

The next step is for these business webs to evolve into market hubs. Facilitators such as CMP Media (a ChannelWave customer) or ven-

CHANNELWAVE INFO
Headquarters: Cambridge, MA
Founded: October 1997
Employees: 232
Funding: \$32.6 million from ABC Capital, Lazard, Softbank, Blue Rock, MF Capital, 21st Century
URL: www.channelwave.com

dors themselves can create private exchanges that allow solutions to be stitched together for customers on the fly from among various partner and vendor offerings. “End-customers are the outside ring,” says Heidelberger. “The channel sells for itself based on the attributes of the complex solution and the needs of that end-customer.”

What’s novel about this model, Williams emphasizes, is that it arises on the demand side. “There are lots of exchanges today on the supply side,” he says, including most of the familiar B2B marketplaces. (As noted above, though, Commerce One also sees itself on the buy side, albeit focused on bigger companies.) “On the demand side, commodities aren’t what gets moved around – it’s complex solutions. We take an end-customer’s complex problem and break it up to component parts. Then partners can bid on the component parts.”

Predicts Heidelberg, “This becomes a natural evolution of what partnering and channels mean. It was popular three years ago to say the channel will be disintermediated by the Web. On the contrary, for complex solutions, where all these parts and pieces have to come together, a new-age channel will form, where there is greater efficiency.” Instead of being primarily one-to-one relationships, channels will become many-to-many, with players inhabiting shifting and overlapping roles in the marketplace. (This fits neatly with the syndication model we articulated in **RELEASE 1.0, JULY/AUGUST 1999.**) As a result, “the power shifts back to the middlemen – and ultimately, the end-customer,” Williams argues.

Eazel

If software were rock n’ roll, Eazel would be the first Linux supergroup. Co-founders Mike Boich, Andy Hertzfeld and Bud Tribble were all senior members of the team that developed the MacOS, the last revolutionary desktop operating system. The announcement in August 1999 that they were creating a company to develop compelling desktop interfaces on Linux was important validation for the open-source platform. The Mac veterans have been joined by alumni of Sun, Netscape and other companies, as well as experienced open-source developers. The company has released previews of Nautilus, its open-source desktop built on the GNOME environment, with plans to launch version 1 later this month or in early April.

Eazel wants to do more than put a Mac- or Windows-equivalent user interface on Linux; it wants to push the logical evolution of the desktop environment. “It came from the realization that the current

EAZEL INFO
Headquarters: Mountain View, CA
Founded: August 1999
Employees: undisclosed
Funding: \$11 million from Accel Partners
URL: www.eazel.com

user environments have been relatively static for a long time,” says vp of marketing Brian Croll. “They were fundamentally designed for the standalone PC,” he continues. “Now people are using their computers in an entirely different way from ever before, specifically driven by the Internet.” Instead of productivity, finance and games, says Croll, email, Web browsing and instant messaging are now the most prevalent activities on desktop systems. Yet, notes Croll, “Those concepts haven’t been built into how you interact with your system. You have to go into an alternative mode called the browser.”

In addition, the number and types of digital media users interact with through their PCs have expanded tremendously since the advent of the Mac, yet file system metaphors haven’t adapted in response. “If you look at a desktop system, it was built on the premise that you had a couple of documents and that’s it,” Croll says. An MP3 file shows up on the desktop as a document, even though it’s an entirely different beast from a word-processing file.

Eazel’s goal is to create a new user experience that is fundamentally network-centric. Croll calls this “a lot of little doors into the Internet.” For example, why store help files as local documents when the user is probably connected to the Internet and able to view an updated, personalized resource over the network?

The same argument applies to the bane of most PC users’ lives: crashes and incompatibilities. “Why shouldn’t we use computers to manage the logistics of a computer?” and automatically run an inventory of what’s on your system against an Internet-based tool, Croll asks rhetorically. In addition to serving users, these kinds of services are the basis of Eazel’s business model. The company will give away the software, but sell subscription services that help users manage their systems and their data.

Croll admits the initial release of Nautilus is focused primarily on feature comparability with commercial OSes such as Windows and MacOs, but promises future versions will move significantly beyond these. “The market we’re serving – Unix and Linux – has been relatively underserved when it comes to user interfaces. We’re bringing huge improvements to the state of the market in the Linux/Unix environment,” he says. “The next step is to make the best user interface on the planet. The shocking thing is that we’re taking something like Linux that people think of as being very technical and making it the most easy-to-use thing in the world.”

KnowNow (D)

We covered KnowNow briefly in our peer-to-peer roundup late last year (see **RELEASE 1.0**, NOVEMBER 2000). At that point, the angel-funded startup was based in Seattle and was busy developing its quasi-secret network-scale event-notification technology. Even great ideas in a hot space such as P2P have no guarantee of finding financing in the current frigid technology market (see Gene Kan's comments above in the P2P roundtable section), but KnowNow bucked the trend, landing financing from Kleiner Perkins late last year. The company moved to Silicon Valley and is filling out its management team including vp of business development Chet Kapoor, who served in that capacity at WebMethods and Active Software. KnowNow is still in development mode, but it will pull back the kimono a bit more at PC Forum.

KnowNow co-founder Rohit Khare is one of those connectors who tie together diffuse social networks, thanks in part to the FoRK (friends of Rohit Khare) mailing list he started back in 1995 and to his time on the staff of the World Wide Web Consortium. He and co-founder Adam Rifkin took leaves of absence from their computer-science PhD programs early last year to start KnowNow.

Khare, picking up a phrase popularized by UserLand ceo Dave Winer, describes his vision in terms of the "two-way Web." "Today's Web represents the best of 1970s system architecture," he says. Every time a browser wants to get an update, it must open a new connection and wait for acknowledgement. The model assumes information flows in one direction: from central servers down to end-users. There's also no good way to create real-time applications that pull data from many points simultaneously. Anyone who has spent time jabbing the "refresh" button repeatedly to follow an EBay auction or a Folio^{fm} portfolio understands the limits of today's Web infrastructure.

All that is beginning to change. The P2P movement has reawakened interest in the concept of end-users as active participants in the creation of content and applications. Similarly, businesses are looking to expose their processes and systems so that they can be tied together across organizational boundaries into new Web services. That's where KnowNow comes in. "We think the excitement is at the edges and not at the middle," says Khare. "What that requires is making sure the middle gets out of the way, through transparent routing that doesn't deadlock on itself."

KNOWNOW INFO
Headquarters: Mountain View, CA
Founded: April 2000
Employees: 30
Funding: \$8 million from Kleiner Perkins and Palomar Ventures
URL: www.knownow.com

“Client-server technologies are based on a synchronous lock-step remote procedure model,” Khare explains. That makes some sense inside an enterprise, where all the applications and the networks between them can be controlled and optimized to work together. On the other hand, Khare points out, “The challenge of doing things across the Internet is that you can’t own all the resources.” Which brings us back to the two-way Web: “The two-way Web is an opportunity to recast enterprise application systems as fluid real-time information flows across organizations.”

“Fundamentally, business-to-business interactions are peer-to-peer,” Khare notes. Organizations constantly exchange information and resources with their suppliers, partners and customers in a web of decentralized interactions. Standards such as the extensible markup language (XML) and simple object access protocol (SOAP) allow developers to create software that follows this distributed model. By melding a robust event bus with Web standards such as Javascript and HTTP, Khare sees the potential to create “a Tibco with angle-brackets”—a high-performance platform for distributed services that run across the open Internet.

Lumeta (D)

Lumeta, spun off from Lucent New Ventures last September, helps companies understand their networks through mapping and firewall analysis. “The original project was simply mapping the Internet and creating open-source databases for researchers, governments and people who needed it. It turns out mapping is useful for a bunch of things,” says chief scientist Bill Cheswick. In addition to collecting data, Cheswick’s team developed algorithms to render the Internet’s complex topology in beautiful color network maps (SEE [HTTP://WWW.LUMETA.COM/GALLERY/MAP2.HTML](http://www.lumeta.com/gallery/map2.html) FOR A SAMPLING).

LUMETA INFO
Headquarters: Somerset, NJ
Founded: October 2000
Employees: 27
Funding: undisclosed amount from Lucent New Ventures
URL: www.lumeta.com

Lumeta still supports a small pure research group that maintains the non-commercial Internet Mapping Project, but its primary focus is to take the technologies developed at Bell Labs and put them to work on business problems. Predictably, says Cheswick, “the same mapping technology that can handle the entire core of the Internet can handle an intranet.”

“We’ve known for several years that intranets are out of control,” Cheswick points out. Despite the best efforts of cios, intranets at large companies inevitably grow and develop in ways their network managers aren’t aware of. Employees add unauthorized dial-in connections; companies merge or are acquired;

people move around; temporary project-specific links become permanent and so forth. The only reliable way to determine which machines are connected (and how) to your intranet is to do a series of pings and traceroutes. That's in essence what Lumeta does, though it uses the techniques honed at Bell Labs to automate much of the process and to extract useful information from the mounds of data.

For example, Lumeta created algorithms to detect leaky servers that could pose security risks. "The whole idea of an intranet is you have a castle with a wall and gates that are firewalls," explains Cheswick. "But the town around the castle has grown" to the point where it's too large to build an effective wall around. Using the same data, Lumeta can also identify routing loops and other configuration problems that degrade network performance.

When hired by a customer, Lumeta does a network census ("We run about a zillion traceroutes, then we run about a zillion pings," explains Cheswick) and generates a detailed map. What comes next is predictable: "The cio looks at the map and says, 'I want it!' They all know that they don't control their networks. This gives them a first idea of what they have. You can't manage what you don't know." Companies vary widely in how well they manage their intranets, Cheswick says, but even those with network mapping experts usually learn things from Lumeta's analysis.

Lumeta's second offering is a tool for analyzing firewalls, which block certain kinds of traffic from flowing across network boundaries. Cheswick, who in 1994 co-authored the first book on Internet firewalls, **FIREWALLS AND INTERNET SECURITY**, says that as firewalls and networks have become more complex, just understanding what sorts of traffic your firewall blocks has become a major challenge. The normal process is to send different kinds of packets at the firewall and see what goes through, but with the vast number of possible configurations, that can take days. And most companies have more than one firewall – Cheswick relates the case of a bank that asked him to analyze the 89 on its network. Lumeta's tool analyzes the firewall's complex machine-readable rules and generates plain-language reports in far less time than the manual alternatives.

OpenDesign (D)

OpenDesign, then in pre-launch mode, appeared in our recent survey of P2P infrastructure companies (see **RELEASE 1.0**, DECEMBER 2000). At PC Forum the company will make its full public debut and reveal additional details about its offerings.

“The Internet made networking really simple, yet still allowed the network to grow underneath. Applications haven’t had that same benefit,” says Edward Jung, co-founder and acting ceo of OpenDesign. “We’re going to make it easy to create applications on the network,” he continues. As we reported in our December writeup, Jung, formerly chief software architect at Microsoft, incubated OpenDesign with ex-Microsoft cto Nathan Myhrvold under the aegis of their partnership Intellectual Ventures. OpenDesign has created a platform and services that dynamically adapt networks to distributed applications.

The immediate benefit for users, Jung says, will be faster and more reliable Internet-based applications that draw on data and logic that are isolated today. By reducing the burden of creating and managing large-scale apps, Jung argues, OpenDesign’s

technology will also increase the variety and richness of application. “We think there’s a lot of untapped potential because it is so difficult to manage and deploy applications on these networks,” Jung argues. “Billions of dollars have been spent on enterprise and open Internet infrastructure, but users don’t see the benefits.”

Jung sees the first use of OpenDesign’s technology in the enterprise. Leading-edge companies are pushing decision-making deeper into the organization and trying to enable better coordination across

organizations. At this year’s World Economic Forum in Davos, he notes, a significant part of the information technology track concentrated on the evolution of the corporation to more flexible, distributed structures. The problem is that existing enterprise software wasn’t designed for this environment. “It’s hard to find a product that doesn’t involve lots of companies hooking together,” Jung notes, “but there’s this huge software gap of building an application that involves an unknown and changing set of resources.”

“If you are working within a company today and you want to create an application with your partners, you are out of luck,” Jung continues. With OpenDesign’s technology, however, “Businesses can create applications that adapt to their rapidly changing relationships. We enable the creation of an application on one machine and as you enlist partners, you can add new nodes and have the application spread to them. It still gets managed centrally on one machine, but it can be hosted in multiple data centers and accessed by users inside and outside the firewall. New features and hardware can also be added easily.” Using this approach, functions such as security policies can still be maintained centrally, Jung says, while allowing developers in

OPENDESIGN INFO
Headquarters: Bellevue, WA
Founded: September 1999
Employees: 65
Funding: undisclosed amount from Intellectual Ventures
URL: www.opendesign.com

far-flung supply chains, divisions or workgroups the freedom to manipulate other application elements

Similarly, service providers today are forced to create applications that are generic for all users, because it's too difficult to give those users the ability to modify and configure the applications themselves. Network operators, hosting providers and others have established distributed points of presence to deliver Internet-based applications, but they don't have good ways to add value on top of the commodity hosting offering. OpenDesign sees this as an opportunity. "When commercial Web services reach critical mass, our products will be ready for their providers," says Jung.

PowerMarket (D)

The first wave of hype around B2B marketplaces has crested and crashed (SEE **RELEASE 1.0**, SEPTEMBER 1999), though in its wake enterprises continue to deploy Internet-based marketplace and procurement software to cut costs and generate additional revenues. PowerMarket wants to offer the next generation of technology for this space, which it calls enterprise commerce intelligence. Where companies such as Ariba, Commerce One and i2 optimize and automate underlying transactions and supply chain flows, PowerMarket focuses on enabling complex decision-making methods that can makes those processes more efficient.

PowerMarket ceo Steve Katz gives a concrete example: "If you have shortage of a critical component like DRAM and you have five product lines that depend on it, maybe you ought to be focusing your attention on the highest margin or most profitable product line. The only way to make that decision is to have access to an aggregated view of what's going on inside and outside the enterprise." PowerMarket gives executives and managers in high-tech companies that global view, so that they can analyze and optimize procurement and supply chain decisions. It has signed Motorola and Flextronics as initial customers and is in discussions with other large manufacturers.

POWERMARKET INFO
Headquarters: Belmont, CA
Founded: April 1999
Employees: 33
Funding: \$10 million from Kleiner Perkins and others
URL: www.powermarket.com

Katz was chief architect at eShop, an early e-commerce startup. While there, he noticed the evolution of more dynamic and automated forms of commerce on the Net. "I had this vision of using software agents to automate the process of monitoring different marketplaces and negotiating and purchasing goods in a delegated way," he recalls. While most of the online agent pio-

neers focused on consumer e-commerce, Katz thought the opportunity would be bigger in the enterprise world. PowerMarket grew out of that original notion.

At the core of its system, PowerMarket has created a virtual dashboard that pulls together information from internal and external sources about inventory, component needs, market conditions and so forth. Though the data already exist, they aren't aggregated and therefore aren't accessible to feed strategic decision-making.

"Information is in disparate systems all over the enterprise. It's mostly structured data, but it's all over the place – and that's just the internal data! The external data is unstructured and it's in all sorts of formats," says Katz. "What we're doing is taking all that data and surgically extracting it in a very focused way," so that it's useful for procurement and supply-chain decisions, he concludes. Behind the dashboard, a rules engine provides recommendations or can execute automated transactions based on historical, current and forecasted data.

One result will be to expand the number of people in an enterprise who have access to the necessary data to make optimal procurement decisions. "It's usually a very limited audience within the company that accesses these applications," notes Katz. Yet as he points out, IBM has 4,000 employees in its procurement department and Motorola has 1,000. Giving more of those workers a holistic view of the supply chain and market landscape is bound to promote better decision-making, especially as PowerMarket's software moves out from individual companies to their trading partners: "When you have this real-time decision intelligence framework that is not only on the desktops of all the enterprise buyers but is on the desktops of all the supply-chain and trading partners, you're creating an ability that has never happened before – an intelligence layer that is really on top of the transaction layer."

The result is a clear return on investment achieved through reduction in shortages and surpluses, overall inventory reduction, improved productivity and risk reduction. As part of its offering, PowerMarket tracks and measures such ROI metrics. "You'll be able to monitor and see the improvements," Katz promises.

Though the B2B e-commerce market is crowded, Katz views most of the other companies in the space as potential partners rather than rivals. Enterprise resource planning (ERP) and supply-chain management systems, he says, can be sources of information that PowerMarket augments with its intelligence layer. Business intelligence vendors such as Cognos, SAS, Business Objects and Informatica are focused more on integrating data across systems and lack deep supply chain competencies

and knowledge. Supply-chain visibility and related vendors such as Seecommerce, Vigilance, and Tilion are point solutions that don't offer PowerMarket's full suite of services, Katz argues.

PurpleYogi

PurpleYogi is tackling a big problem: helping individuals and companies manage unstructured data. It creates information-discovery systems that let users quickly and easily find documents, news items or other resources that meet their interests.

Corporations have spent billions of dollars on databases and other systems for organizing structured or tagged information, says co-founder and chairman Rakesh Mathur. Despite this, he says, "the evolution from the mainframe era through the client-server era and on to the Internet has placed power in the hands of the individuals in companies. The result is an incredible amount of unstructured information that has now been brought onto networks." Roughly 90 percent of corporate information is unstructured, he estimates. It's the word processing files, Powerpoint slides, sales forecasts and everything else that employees really care about. And there's a lot of it. While the entire Web takes up about 27 terabytes, a single decent-sized corporation may have 250 terabytes of unstructured data sitting on its intranet, claims Mathur.

From big problems come big opportunities. That's what attracted Mathur, one of the founders of comparison-shopping engine Junglee (SEE **RELEASE 1.0**, MARCH 1998) and his co-founders at PurpleYogi, Ramana Venkata and Ramesh Subramonian, former scientists at Intel's MicroComputer Research Lab. "Just as structured information has its Oracle, so will unstructured information. PurpleYogi wants to be that company," he says. The company's new ceo, Nimesh Mehta, should be able to help. His former position was running the industry and front-office applications division at the real Oracle, reporting directly to Larry Ellison.

"At Junglee we were delving into deep vertical spaces and enabling relational queries about those spaces across multiple Websites," explains Mathur. "What we're doing at PurpleYogi is looking at documents across the widest range of interest areas, understanding what the documents are about and then using this discovery to bring information to users which they might not have found on their own."

PURPLEYOGI INFO
Headquarters: Mountain View, CA
Founded: September 1999
Employees: 100
Funding: \$33 million from Softbank, Infosys Technologies, Intel and Skyblaze Ventures
URL: www.purpleyogi.com

How is this different from existing search engines? “PurpleYogi’s software understands concepts, so it knows what a document is about,” Mathur says. To achieve this, PurpleYogi first analyzes and clusters the target documents to generate a concept taxonomy specific to that data set. As users make requests, PurpleYogi’s client-side software generates a parallel, locally stored profile of the user’s unique interests. It uses that information to refine the taxonomy and classifications on the back end.

This bi-directional approach is a difference between PurpleYogi and other solutions such as Autonomy, Mathur argues. With other technologies, he explains, “there’s no adaptive learning that keeps taking place. And every time our system looks at a document, it learns and adapts. In addition, PurpleYogi’s ontology development tools give customers the ability to understand documents in the context of their business rules and requirements. Because our system is distributed versus centralized, thousands of computers in an enterprise network do the job of classifying and distributing documents.”

The result, Mathur says, is a kind of distributed information management, leveraging users’ tacit knowledge (as reflected in their behavior) without requiring them to change their behavior or manually assign structure to information.

PurpleYogi has announced a deal to make its service available to media companies including *The Wall Street Journal* and *Financial Times* and is currently in pilot in major enterprises. Though PurpleYogi offers a free demo version of its client software on its Website and is talking with portals about licensing deals, Mathur sees large enterprises as the company’s primary revenue source going forward.

Seven (D)

Seven founder and ceo Bill Nguyen is a serial entrepreneur whose last gig was Onebox (SEE **RELEASE 1.0**, JUNE 1999), a unified messaging company sold to Openwave (née Phone.com). At the end of his time at Onebox, Nguyen was responsible for developing relationships with wireless carriers to resell the company’s services. “The operators were clearly focused on the consumer marketplace,” he says, because they had to recoup the anticipated costs of third-generation (3G) spectrum licenses and infrastructure build-outs. “I thought it was interesting that there was a lack of focus on the enterprise market. We spent time with the carriers and they constantly said to us, ‘We’d love to be in the enterprise space, but we don’t know how to reach them.’”

With Seven, Nguyen believes he has the missing pieces for enterprise wireless data services to take off. The name, in case you were wondering, comes from SS7, the signaling network that controls service management in the telephone world (SEE **RELEASE 1.0**, DECEMBER 1999). “SS7 was great because it allowed operators to sell value-added voice services. It also allowed multiple operator networks to work together,” Nguyen explains. “I wanted to do the exact same thing for wireless data that SS7 did for voice.”

SEVEN INFO
Headquarters: Redwood City, CA
Founded: June 2000
Employees: 65
Funding: \$34 million from Ignition and Greylock
URL: www.seven.com

Nguyen spoke with cios at major corporations to determine what was holding them back from deploying wireless data services. Most of the time, it was a simple cost-benefit equation. Only 20 to 30 percent of their employees were highly mobile professionals and therefore likely to be active users of wireless data services. Given uncertainties about implementation, it simply wasn't cost-effective to roll out services for those employees. As a result, while 87 percent of cios Seven surveyed said they wanted to implement wireless data services, only 25 percent planned to do so over the next 12 months.

Seven has created a platform to overcome these hesitations by addressing enterprises' key implementation questions concerning wireless data. It offers centralized management of users and security policies, prioritized quality-of-service guarantees for enterprise traffic over wireless data networks, and the ability to create services that run over all the major wireless network technologies (GSM, TDMA, CDMA and impending 2.5G and 3G systems). “The enterprise can focus just on the application development and we handle all the other issues,” promises Nguyen. “We make it easier to make the decision to go wireless.”

Rather than sell to enterprises directly, Seven will market its services to wireless carriers to resell to enterprises. “From the operator level, it's the first time they are able to sell value-added services beyond metered access,” says Nguyen. Using Seven's service platform, carriers can offer and bill for wireless data services such as virtual private networks. To capture some of the revenue upside, Seven charges carriers a per-user fee for such services in addition to its base software license fee. Seven's first carrier partner is British Telecom's BT CellNet; it has also announced a deal with Microsoft to integrate Microsoft's Mobile Information Server with its offering.

Says Nguyen, “We think this is a win for everyone. Wireless carriers address the enterprise market with value-added services. IT managers enjoy the gains in productivity inherent in extending the desktop beyond a corporate environment.

Developers are freed to focus on what they do best – build killer applications. And the end-user? Well, they get the biggest benefit – untethered access to information.”

Verb (D)

Verb, like PurpleYogi (see above), wants to make it easier for people to find things. But there the similarity ends. Whereas PurpleYogi automatically delivers relevant content based on dynamic profiles, Verb enables smart navigation across multiple platforms. In other words, Verb concentrates on situations – choosing a movie, buying a mutual fund – where users seek to complete a task rather than engage in open-ended research. Search engines often aren’t effective in this environment: They don’t understand the context of the user request, and they return too many results.

The problem is especially acute when transactions take place over non-PC devices such as kiosks, phones and handheld computers. As Verb ceo Eileen Gittins notes, “The old methods of doing search and navigation just aren’t that useful in a handheld device.” Having to scroll through irrelevant results on your PC’s 21-inch monitor is annoying enough, but on a mobile phone it will probably make you scream.

VERB INFO
Headquarters: San Francisco, CA
Founded: January 2000
Employees: 19
Funding: \$6 million from WR Hambrecht and Venture Strategy Partners
URL: www.verb.com

“As we move into these other more task-oriented platforms, how do you help people find things?” Gittins asks, before answering her own question: “At the end of the day, the things that are going to make these emerging platforms really work is if they are accessible and useful in the way people naturally think.” Moreover, companies can’t afford to build entire interfaces and user profiles from scratch on

each new platform. With Verb, they can create a domain-specific context model once and deploy it across the Web, handhelds, voice systems and other platforms.

Gittins was ceo of Personify, which sells user modeling and segmentation software to e-commerce companies, until she stepped down last year. Tony Conrad of Venture Strategy Partners asked her to join the board of a new startup founded by Kris Hammond, a professor at Northwestern who had been engaged in human-computer interaction research for several years. “They were looking for someone who had been thinking a lot about the behavioral side of the Web,” she says. They also needed someone with business experience, and Gittins fit the bill. When the board decided it needed to bring in a ceo, its other members asked Gittins to take on the job. She agreed last August.

Under the hood, Verb's technology uses algorithms to score the similarity of items to one another along multiple dimensions. With the help of non-technical tools, Verb's customers identify attributes that users are likely to reference in their requests. The system then makes it possible for end users to search along these qualitative dimensions. "Everybody in the universe thinks in terms of 'like this'. We think it's hugely powerful," says Gittins. "People respond to examples far better than they can natively type in a query."

For example, one Verb prospect is a financial services company that wants to make it easier for users to find stocks to purchase. Using Verb's technology, a customer could start by entering the name of a stock they knew or owned. Verb would come back with a suggestion, telling the customer how the new stock matched their original input. The customer could then ask for something "like that but less risky" or "like that but less volatile." Or they could move laterally into an entirely different category, such as "like that but not high-tech."

"I have felt for a long time that the thing that's going to propel market adoption, I mean *really* big-time market adoption of interactive technologies, is somehow breaking through to make them smarter than they have been historically," Gittins says. "When we move into a task orientation, it becomes less about content, and more about context." By understanding context in a human-like way, Verb's technology helps guide users to what they are looking for. The company is targeting enterprise productivity applications, e-commerce, financial services and new interactive entertainment platforms as initial market opportunities.

Gittins argues that the need for technology such as Verb's increases significantly as non-PC devices take off. "With these new and emerging platforms, it's a question of, 'Can you or can you not?' The problem they are having is there aren't good ways to navigate at all on these new platforms. It's the difference between adoption and death," she says.

Voxeo (D)

"There are vast changes sweeping all of software, none more profound than in telephony," declares Voxeo ceo Gary Reback. You may recall Reback's name from his prior life, as a partner at Silicon Valley powerhouse law firm Wilson Sonsini. It was Reback who, on behalf of Netscape and an un-named collection of technology companies, filed the first briefs encouraging the Justice Department to engage in an anti-trust action against Microsoft.

What convinced Reback to leave the law for a technology startup? “For the past 25 years I’ve been involved with market-transformative kinds of things,” Reback says. “What got me excited was the opportunity to participate as more than an outside lawyer.” His co-founder and cto Jonathan Taylor started InterResearch Development Group, which launched the first Internet-based unified messaging system in 1995.

Voxeo wants to bring together the Web and telephony by making it as easy to create phone-based services as it is to develop applications today for the Web. As Taylor observes, there are some 1.6 billion phones in use in the world today, but only a tiny number of developers with the knowledge and resources to create applications for that platform. Voxeo offers graphical tools, hosting and pre-provisioned network infrastructure to lower the barriers for developers and companies interested in creating new phone-based applications. It supports standard scripting languages such as VoiceXML and CallXML, its own creation designed for call-management functions.

VOXEO INFO
Headquarters: Scotts Valley, CA
Founded: November 1999
Employees: 120
Funding: \$40 million led by Crosspoint and Mayfield Fund
URL: www.voxeo.com

“We have simplified creation in a way that people who are used to using Web approaches can do this,” says Reback. With minimal marketing and hardly any information available about the company, Voxeo already has 1,500 developers signed up on its community site, with some 300 applications in development. These range from voicemail and traffic reports to unified messaging and appointment scheduling. “For people in Web space, it’s almost intuitive. They are searching for mechanisms beyond the computer to bond more closely with their customers,” Reback observes.

In contrast to voice portals such as Tellme (SEE **RELEASE 1.0**, MAY 2000), Voxeo concentrates on the platform opportunity rather than marketing its own applications. (It is, however, creating a demonstration application for PC Forum attendees to showcase its technology.) In addition to independent developers and corporate customers, it is talking to services providers who have created vertical-market or specialized applications such as phone-based email access. Customers so far include Ask Jeeves, Schedule Online, Postini and OfficeDepot.com. Voxeo’s business model is to charge for commercial use of its network; creation, testing and trial deployment of applications are free.

Because Voxeo has deployed the redundant data centers, created the development environment and provisioned the toll-free and local-access numbers, these customers can concentrate on their services rather than having to create the entire net-

work from top to bottom. “We’re like the Akamai or Exodus of the space. We optimize at the infrastructure layer,” says Reback.

Voxeo has even made headway with the group one would expect to feel threatened by its offering: computer-telephony integration (CTI) developers and vendors. Notes Reback, “We had fundamentally underestimated the amount of pain and suffering that was going on in telephony space.” The CTI world knows the Web heralds fundamental changes in telephony, he says, so it’s moving to jump on board rather than be crushed. ■ R 1.0

COMING SOON

- The new network.
- Broadband service platforms.
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- And much more. . . (If you know of any good examples of the categories listed above, please let us know.)

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